Networked Naval Command and Control

FORCEnet

The Naval Component of the GIG

Command and Control Component of Sea Power 21

Enterprise Wide

a Process and a System

Presented by:
CAPT Rick “Simo” Simon - NNWC
Date: 25 Oct 2005

Networked Naval Command and Control

SSG Definition

"FORCEnet is defined as the operational construct and architectural framework for naval warfare in the Information Age, integrating warriors, sensors, command and control, platforms, and weapons into a networked, distributed combat force."

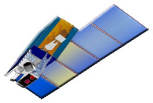
What is the Operational Definition of FORCEnet?

Networked Naval Command and Control

Operational Definition of FORCEnet:

- **Systems and process for providing networked naval command and control.**
  - Provides means and methods for commanders to continuously make the *best possible decisions faster* and see to the *effective execution* of those decisions.
- **System: What commanders *use*.**
  - *Infostructure (people, information and C4 systems) supported by the enterprise wide DOTMLP-F*
- **Process: What commanders do.**
  - Accelerate C2 by changing the way information moves
  - Collaborative, distributive enterprise approach
  - Self-synchronization of multiple decision cycles

The "System" FORCEnet



Global Information Grid

JOINT ENTERPRISE

DISN GIG-BE GBS STEP / TELEPORT TSAT NCES IA JTRS

Army Enterprise
LandWarNet

WARFIGHTING
OPERATIONAL SUPPORT
INFOSTRUCTURE
LandWarNet

Air Force Enterprise
C2 Constellation

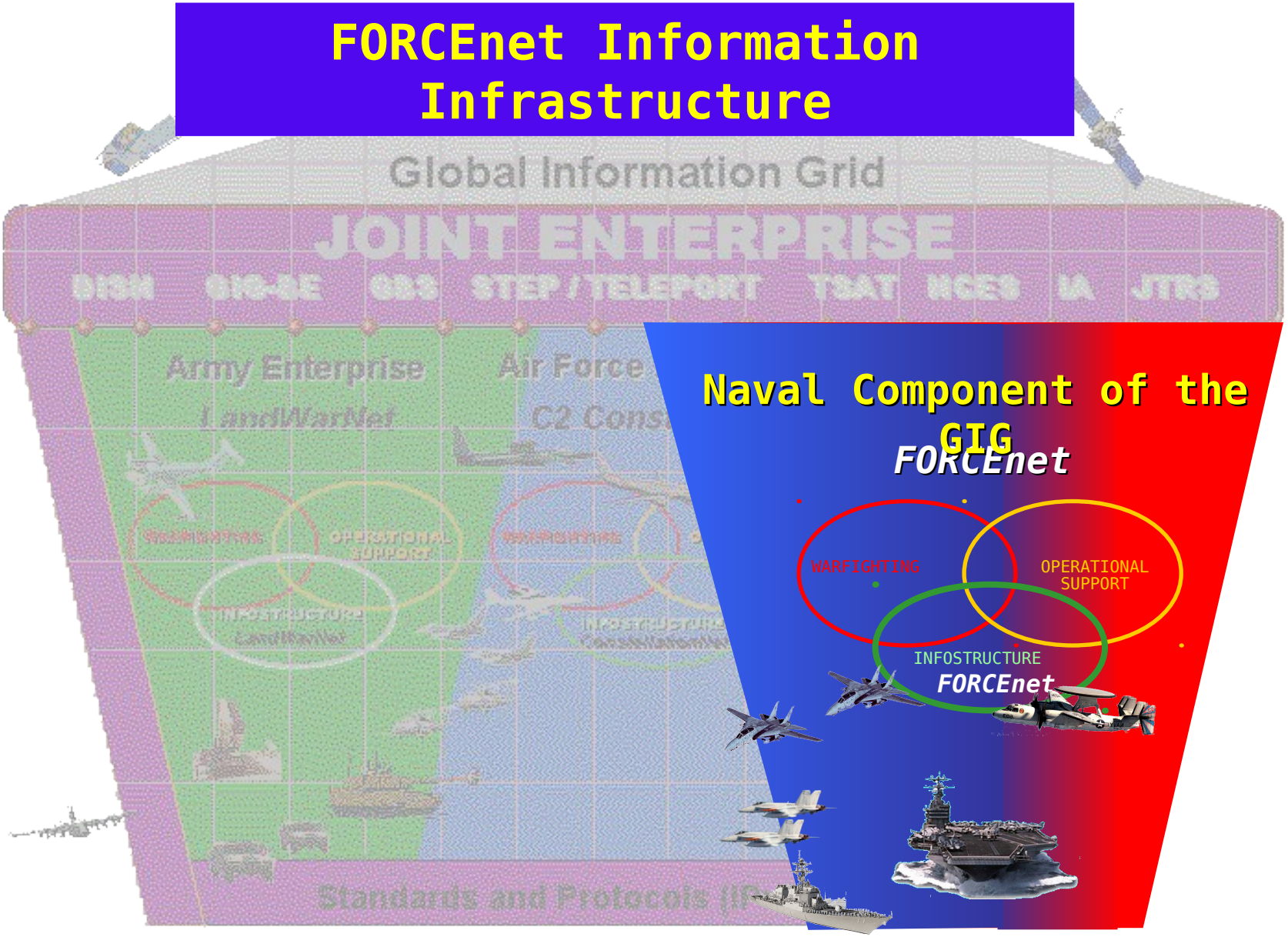
WARFIGHTING
OPERATIONAL SUPPORT
INFOSTRUCTURE
ConstellationNet

Naval Enterprise
FORCEnet

WARFIGHTING
OPERATIONAL SUPPORT
INFOSTRUCTURE
FORCEnet

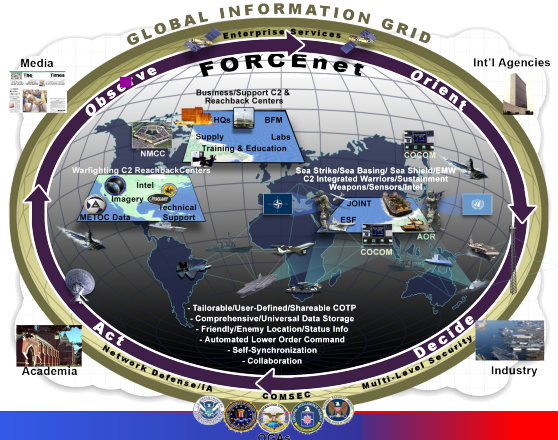
Standards and Protocols (IPv6) + NetOps

The "System" FORCEnet

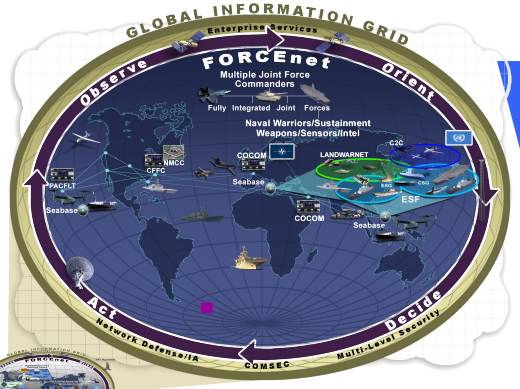


The "System" FORCEnet

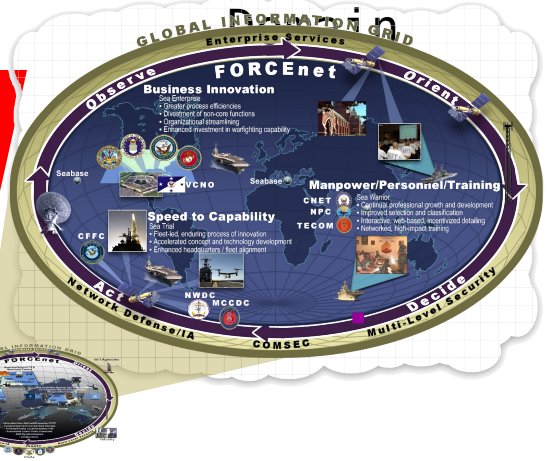
Enterprise Wide



Warfighting Domain

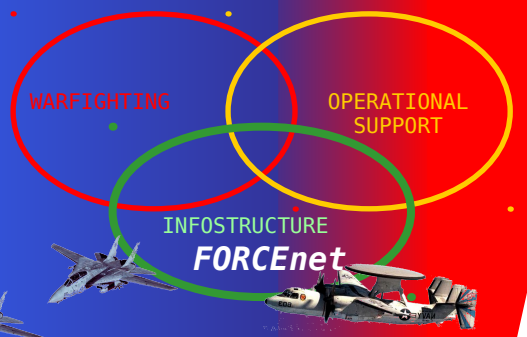


Business Domain



Naval Component of the GIG

FORCEnet

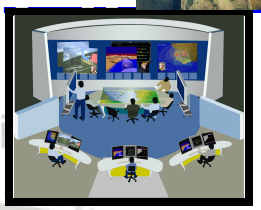


FORCEnet Information

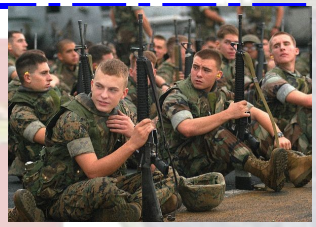
The "System" FORCEnet

Commanders

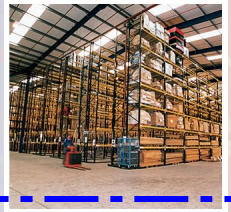
Staff



Units



Support



Sensors

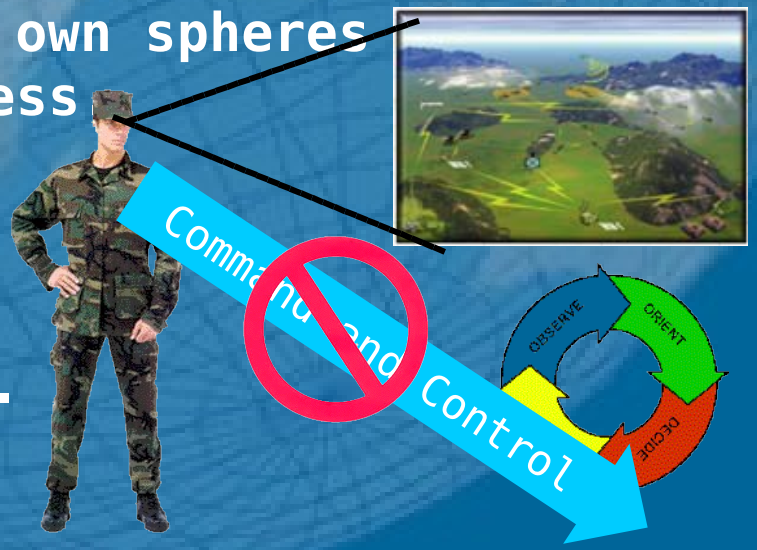
Weapons

Other Equipment

Warfighting Domain
Enterpr ss Domain
FORCEnet Information Infrastructure

Networked Naval Command and Control

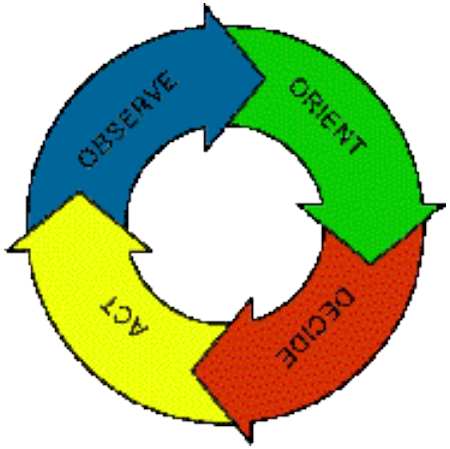
- Control emerges from the collective and transparent actions of various decision makers exercising judgment and authority within their own spheres of *broad* awareness



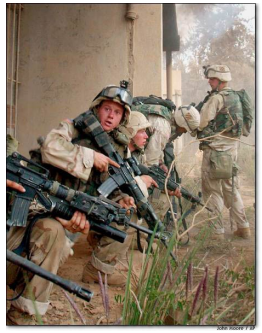
- Control is NOT something seniors impose on subordinates... It is a state the entire system achieves based on feedback about the developing situation.

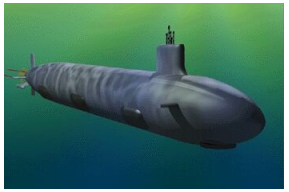
The “Process” FORCEnet

Commander Sees Overall Arena



Orders for Action

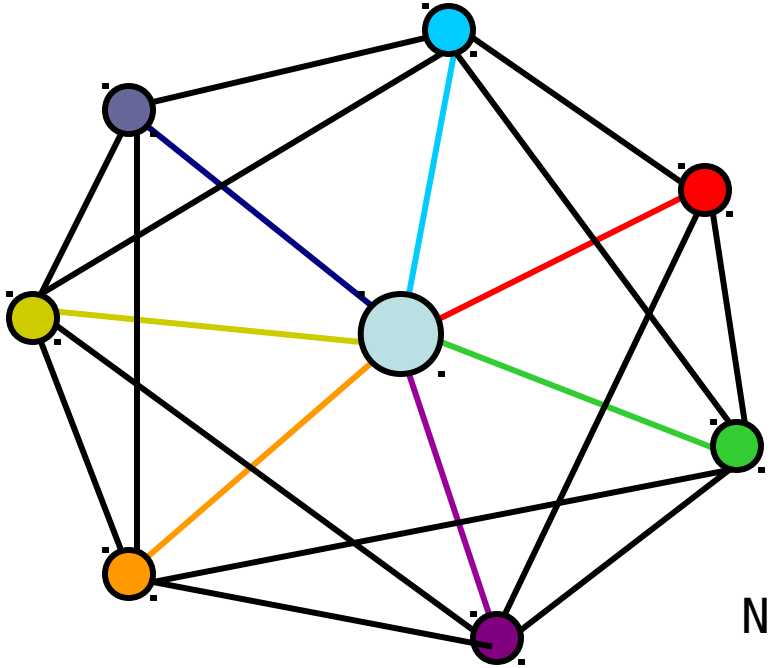




Blue Forces Begin Engagement

The “Process” FORCEnet

Every node in the Network



Decentralized

Can Be:
- Procedure
- Processor
- User of Information

Cumulative Networking Effect!

All Readily Available to Any Node!

The “Process” FORCEnet

C2 Characterized By:

Shorter Decision Cycles

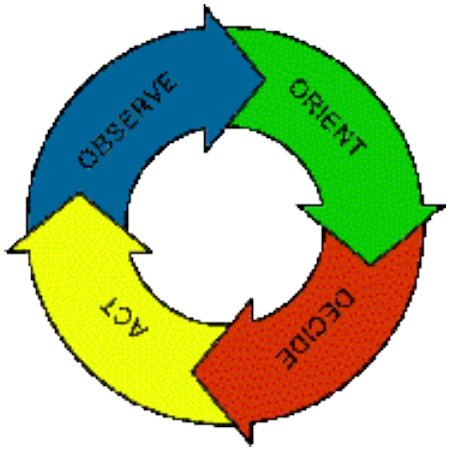
Enhanced Shared SA

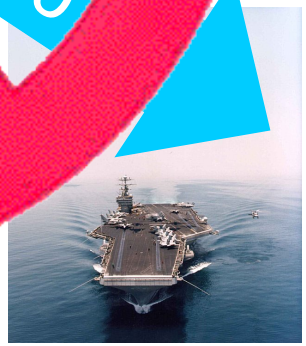
Informed Self-Synchronization

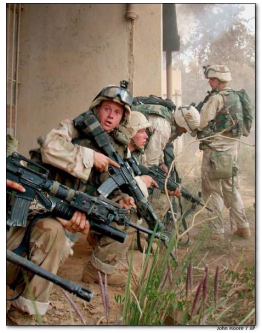
Across the Entire Enterprise

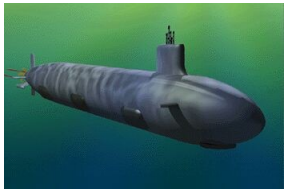
The “Process” FORCEnet

Commander Sees Overall Arena









Blue Forces Begin Engagement

The "Process" FORCEnet

Commander Sees Overall Arena

Command

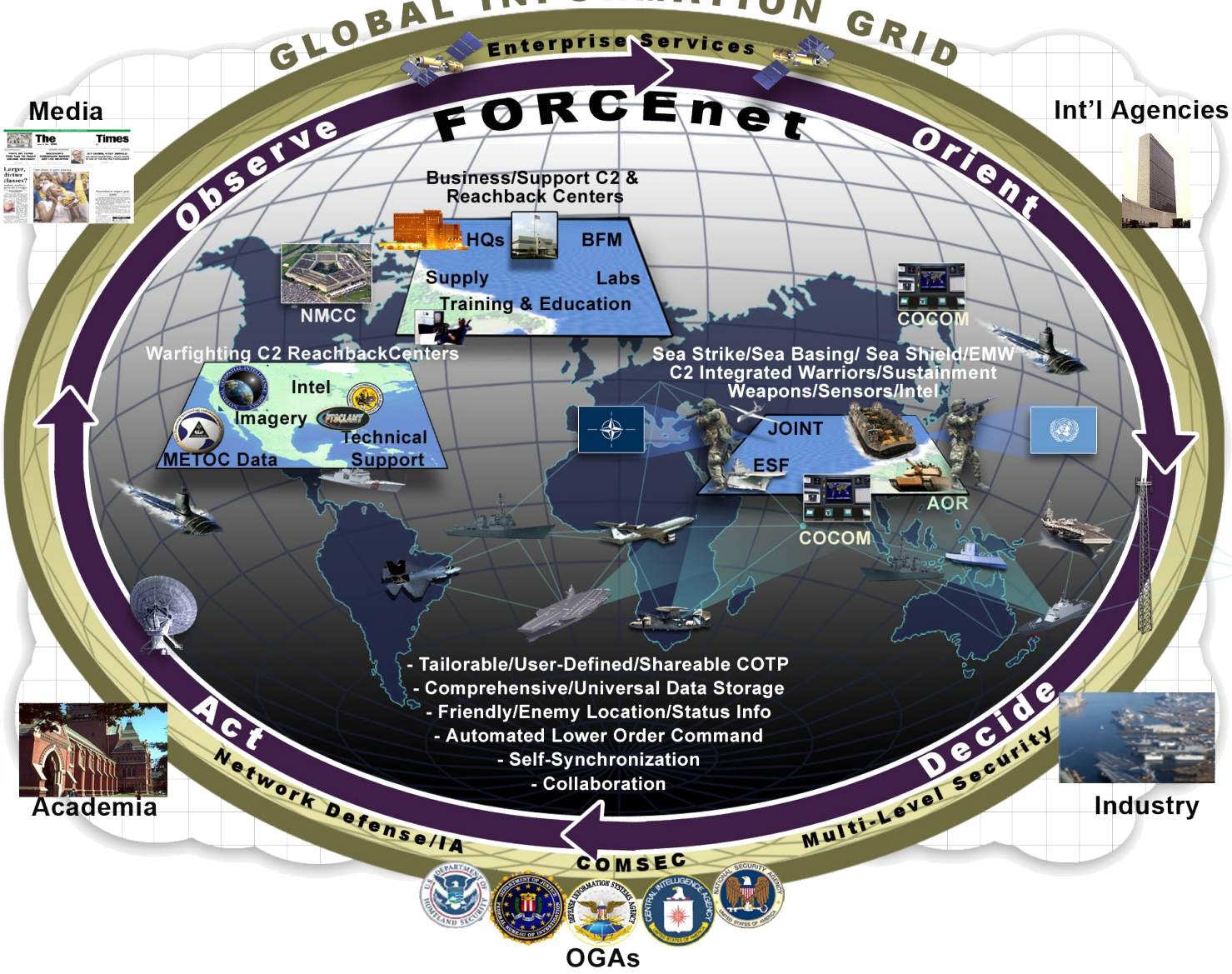
Orders for Action

Control

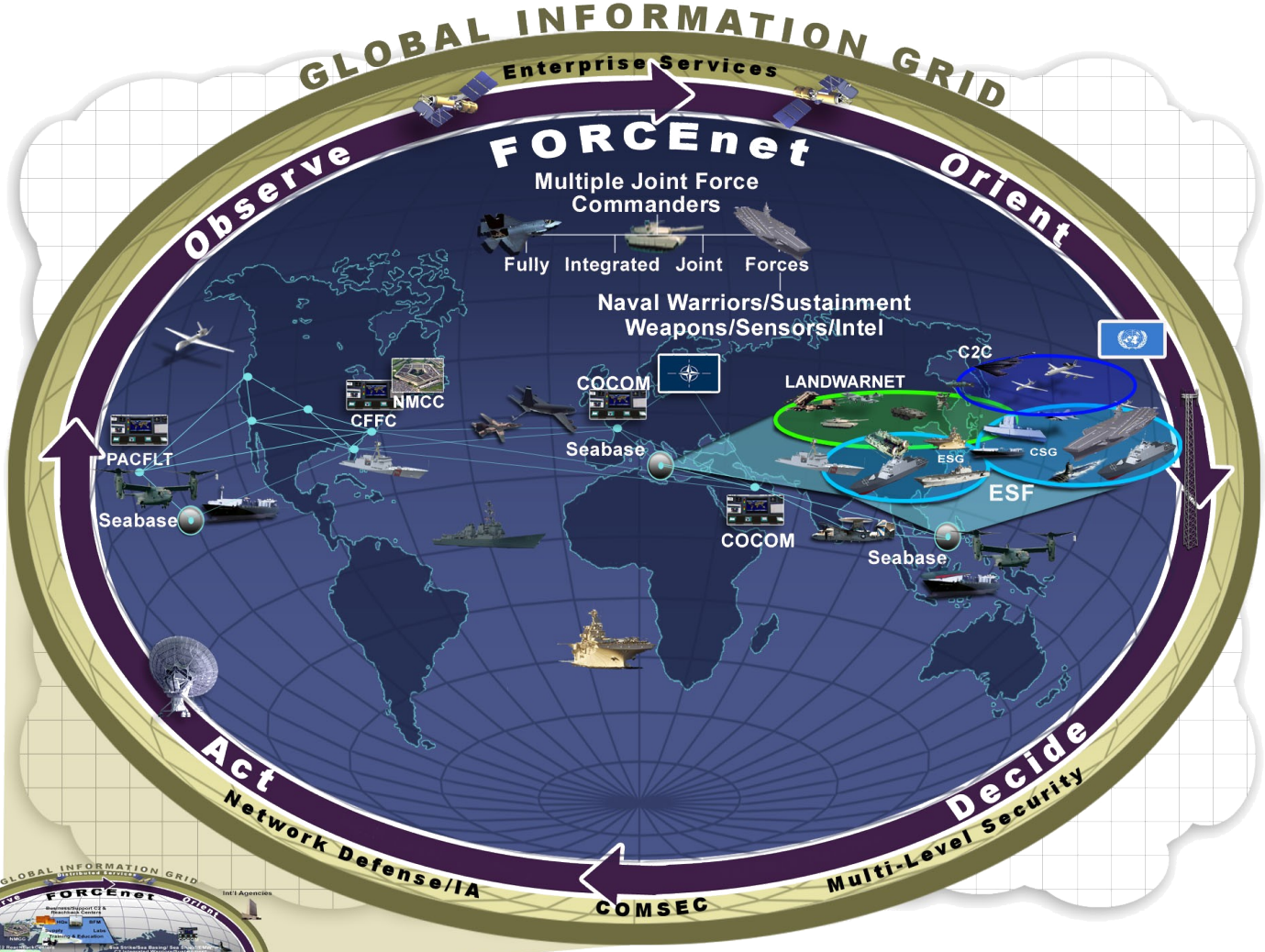
Feedback of Developing Situations

Blue Forces Begin Engagement

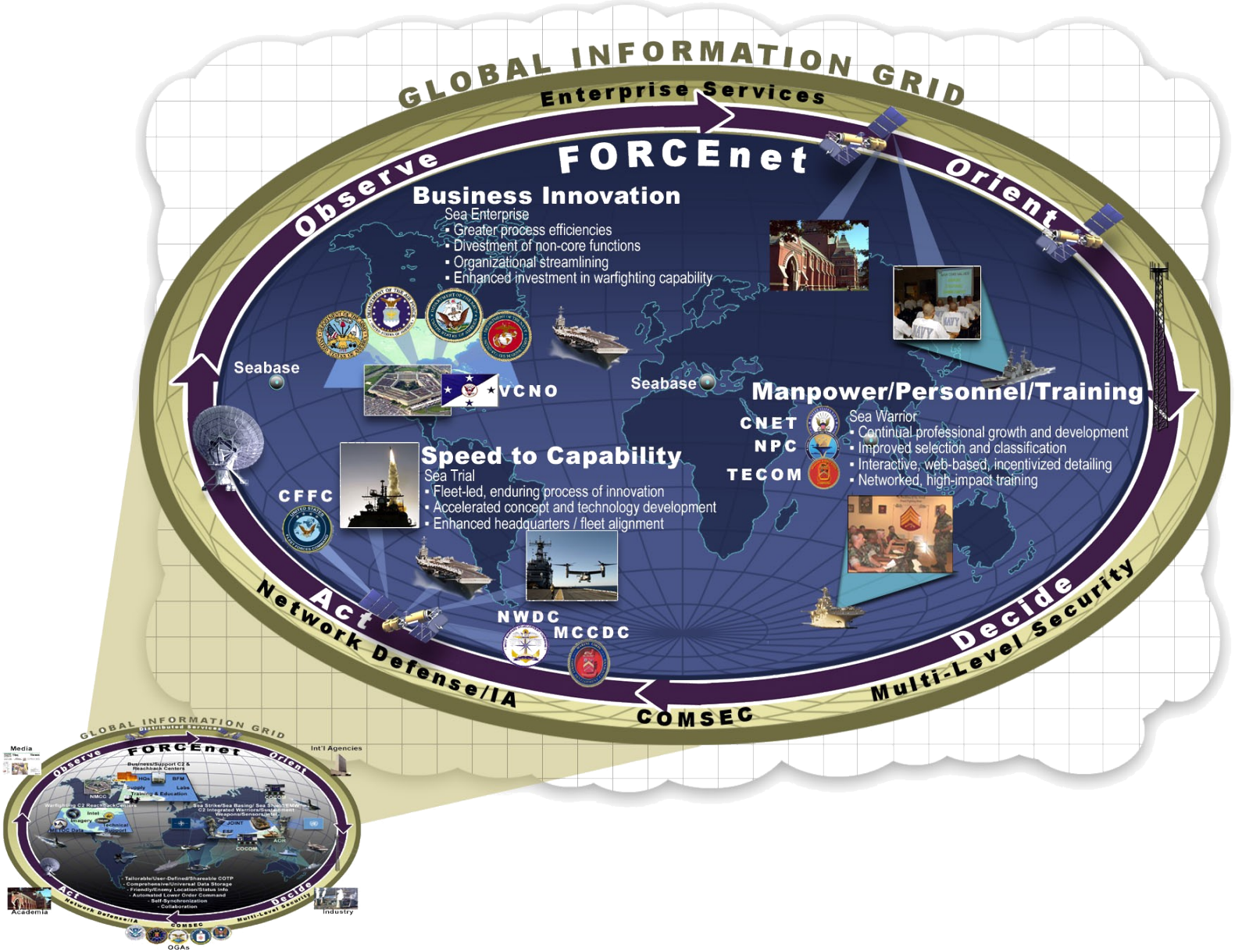
FORCEnet High-Level Concept Graphic



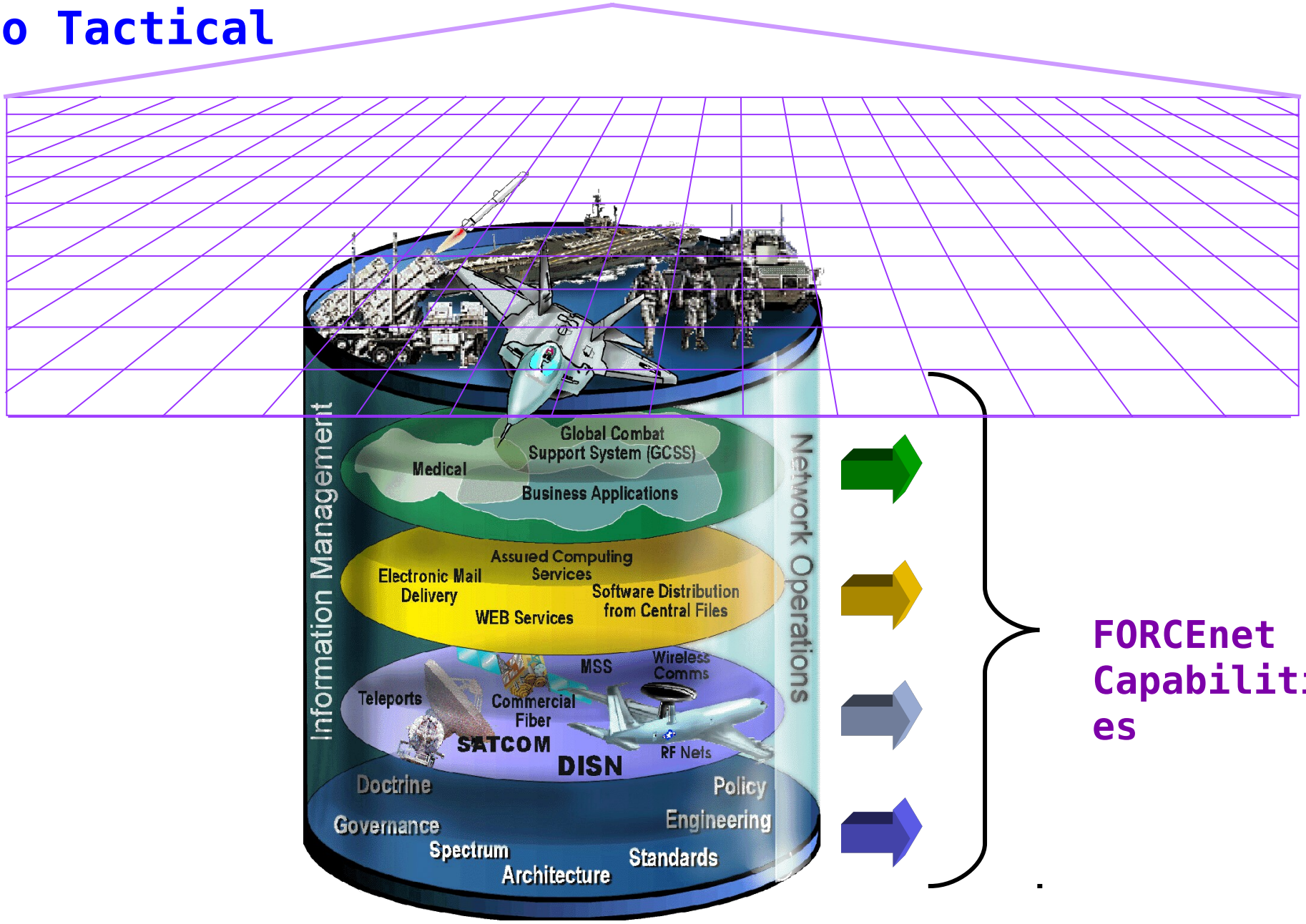
FORCEnet Warfighting Domain OV-1



FORCEnet Business Support Mission Domain OV-1

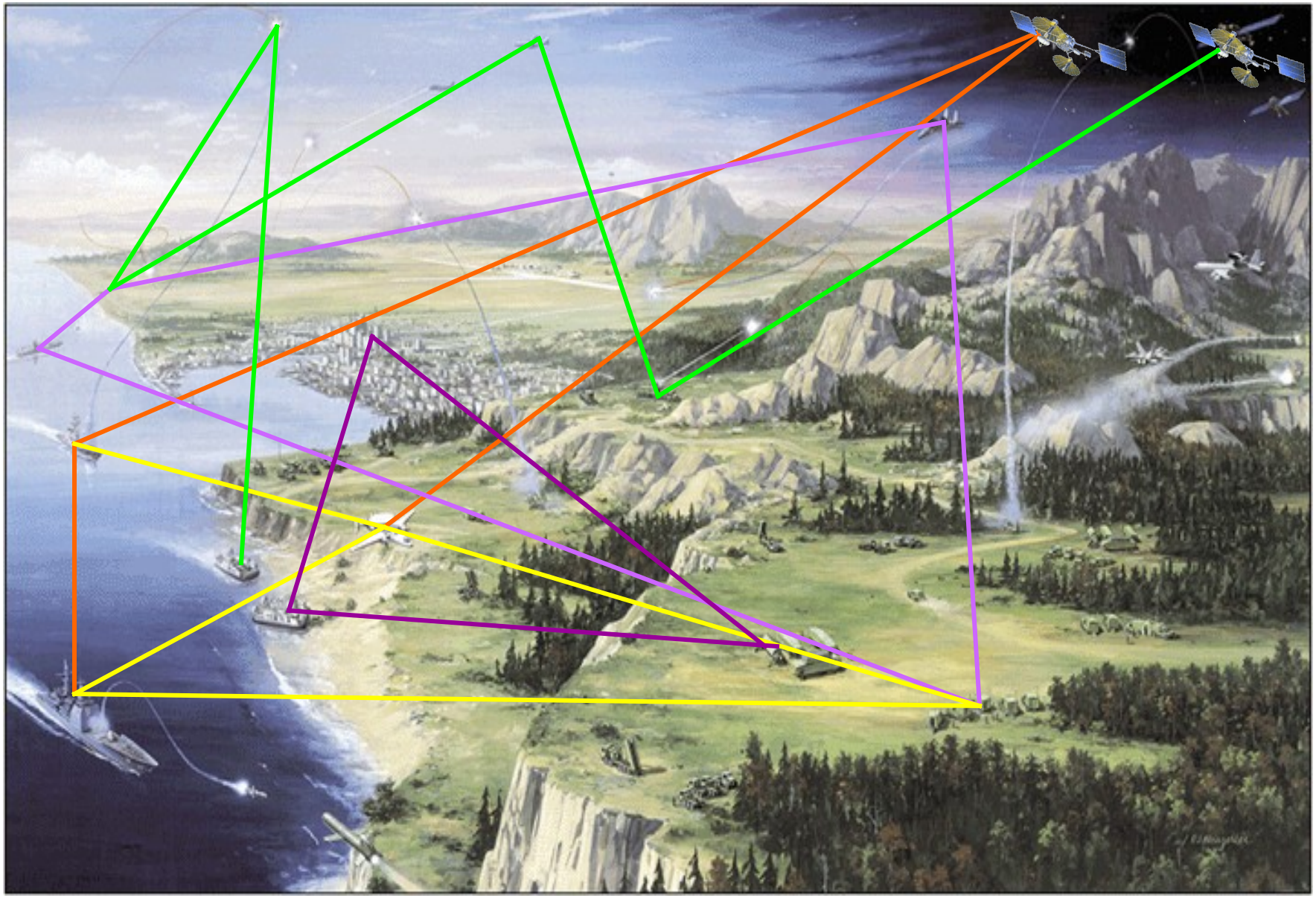


FORCEnet nets the full Spectrum from Strategic to Tactical

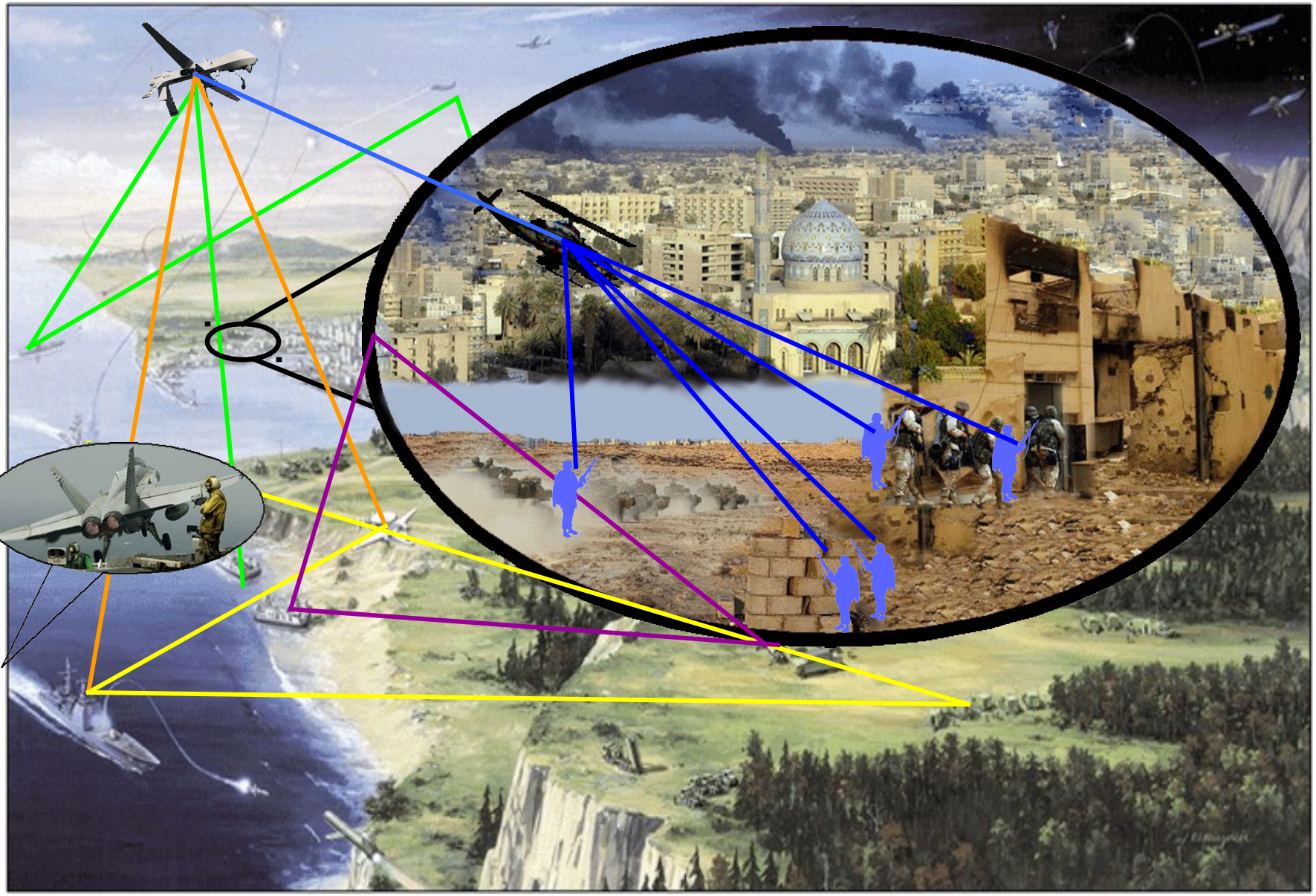


FORCEnet Capabilities

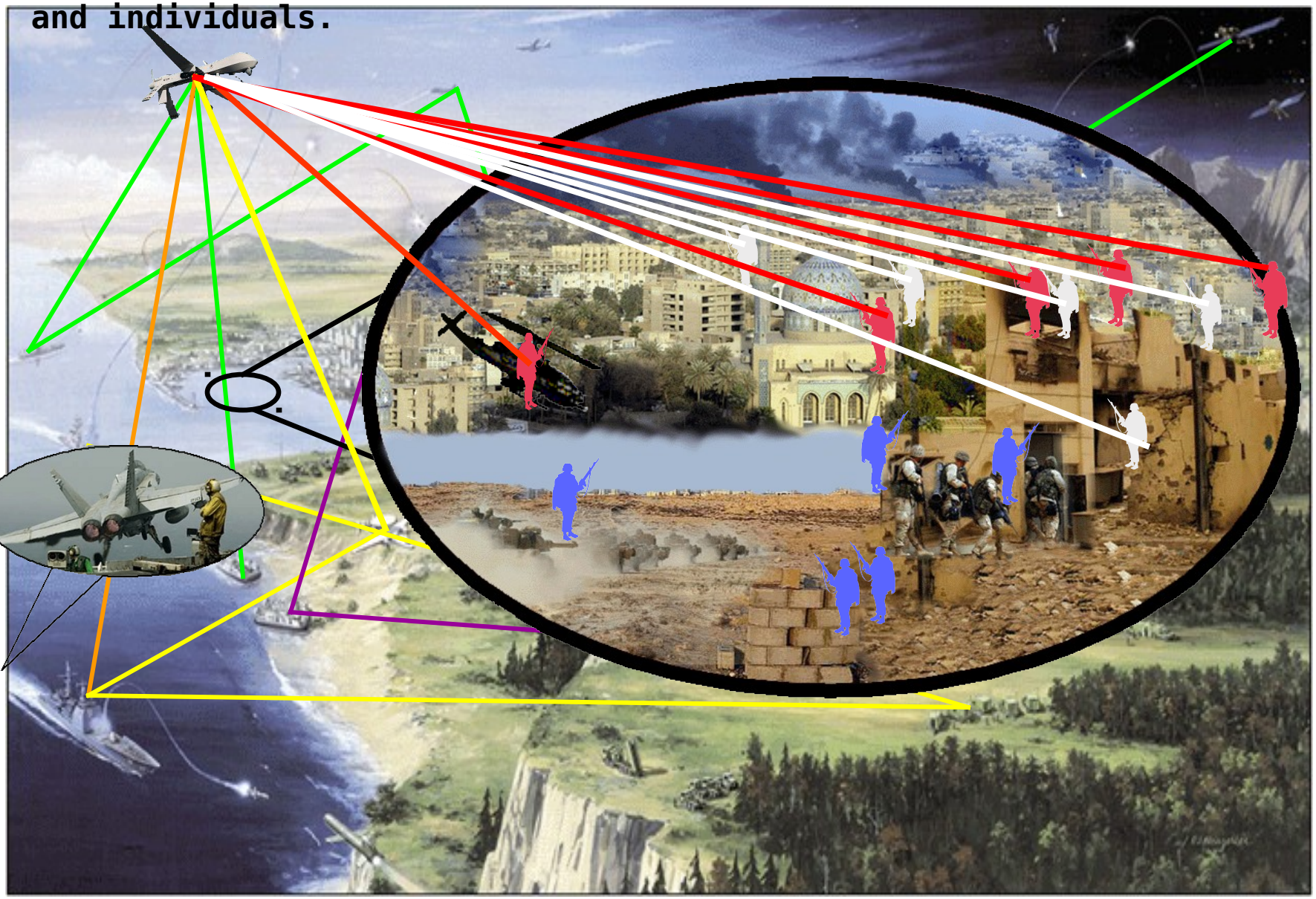
Capability 1: Robust, reliable communication to all nodes.



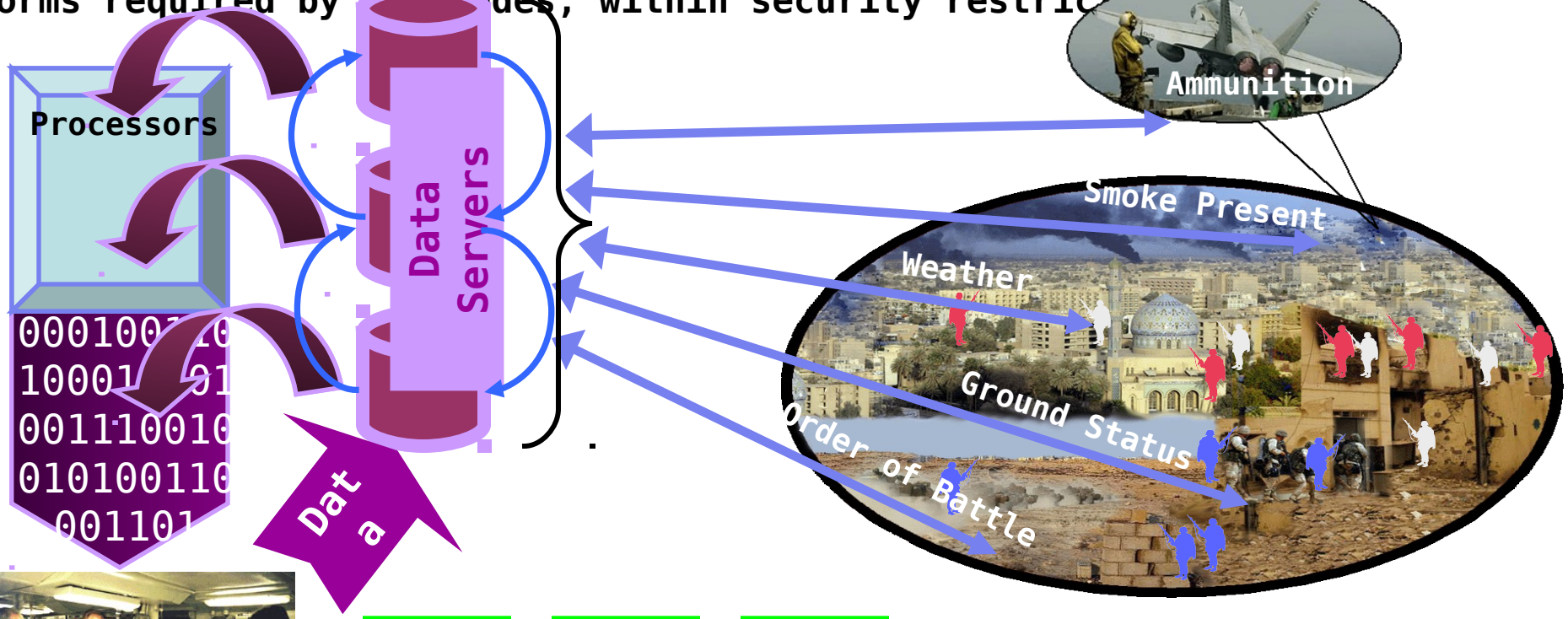
Capability 2: Reliable, accurate, and timely location, identity and status on all friendly forces, units, activities and entities/individuals.



Capability 3: Reliable, accurate and timely location, identification, tracking and engagement information on environmental, neutral and hostile elements, activities, events, sites, platforms, and individuals.



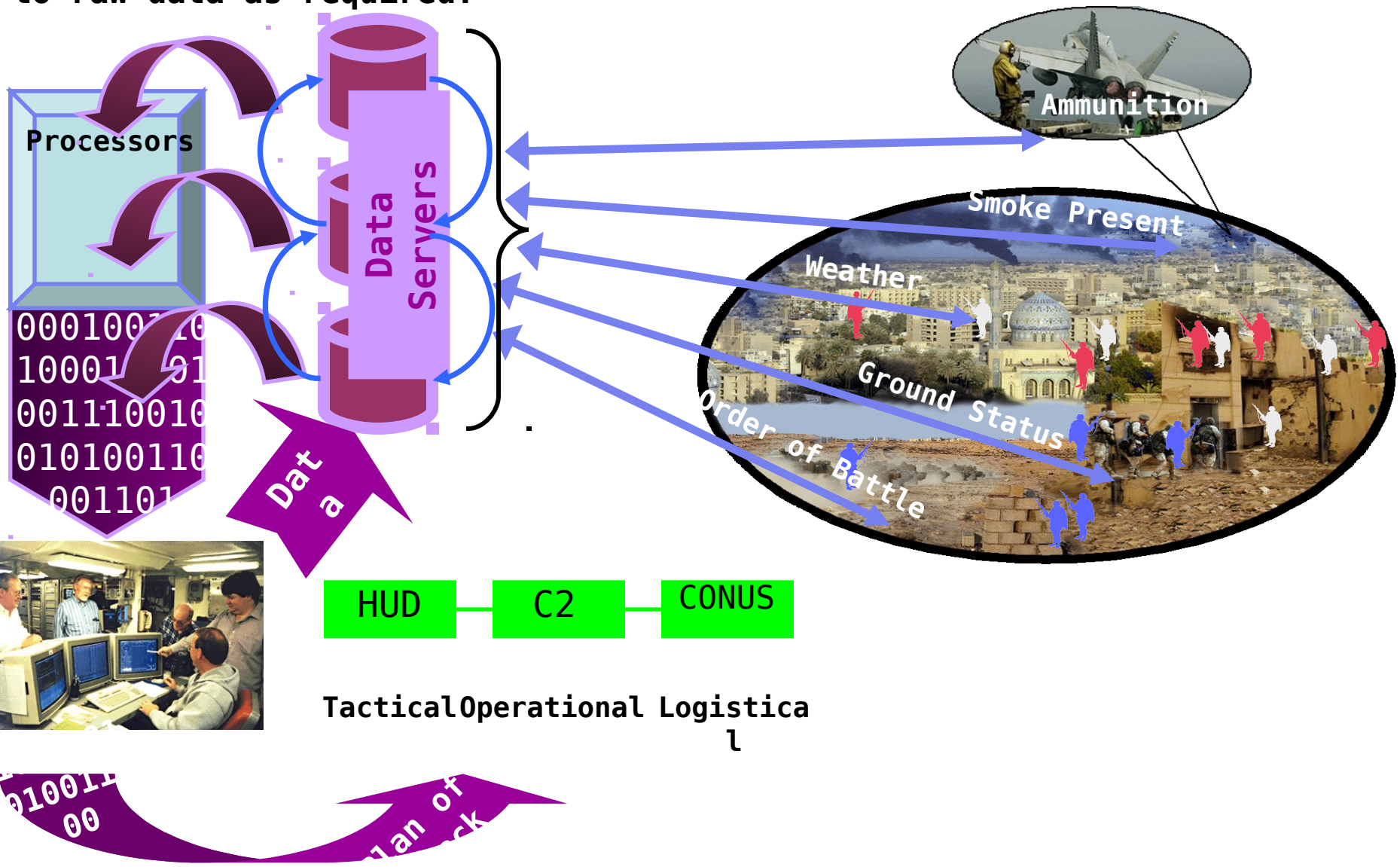
Capability 4: Store, catalogue and retrieve all information produced by any node on the network in a comprehensive, standard repository so that the information is readily accessible to all nodes and compatible with the forms required by [illegible]des, within security restrict[illegible]



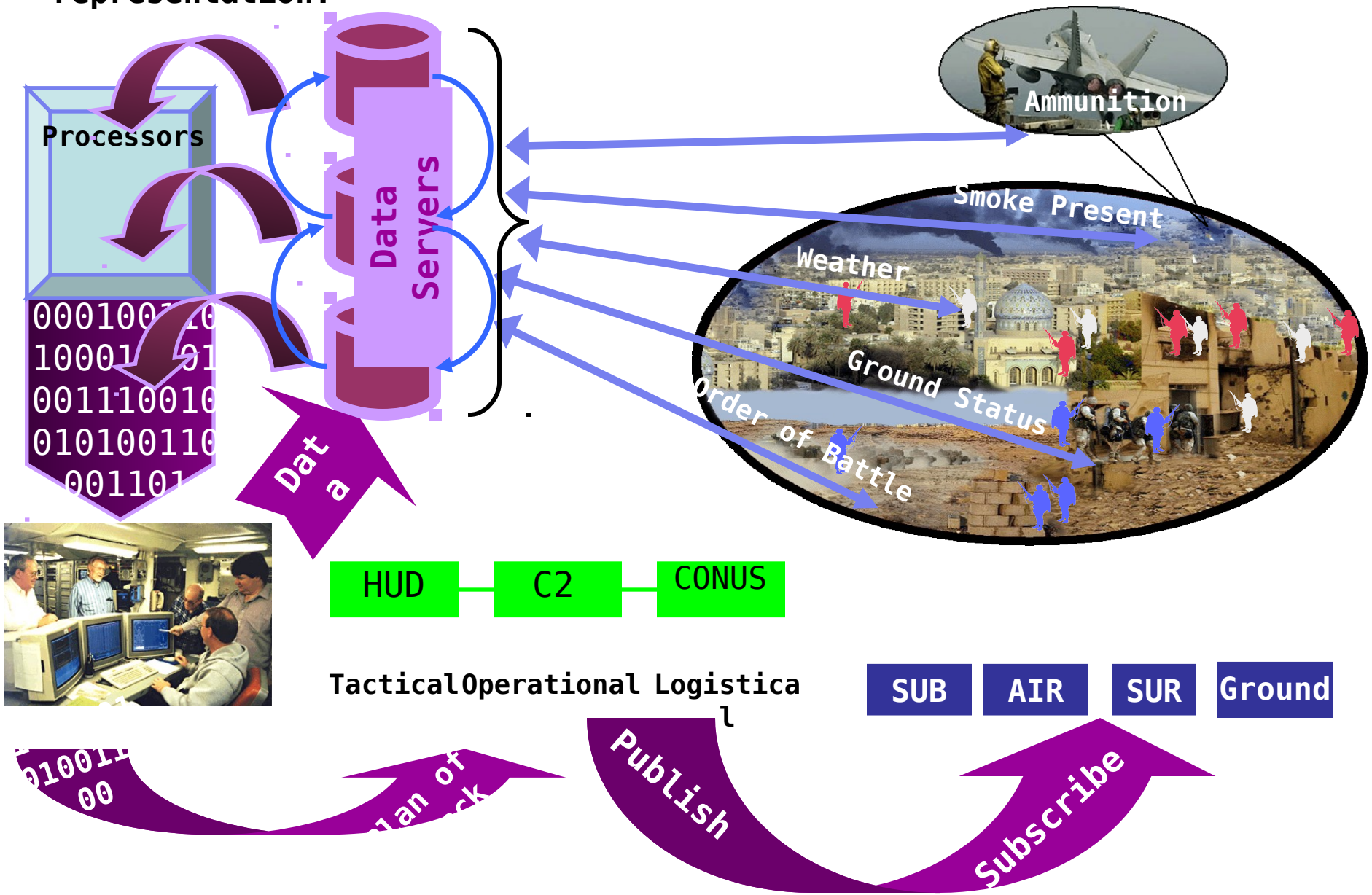
HUD — C2 — CONUS

Tactical Operational Logistical

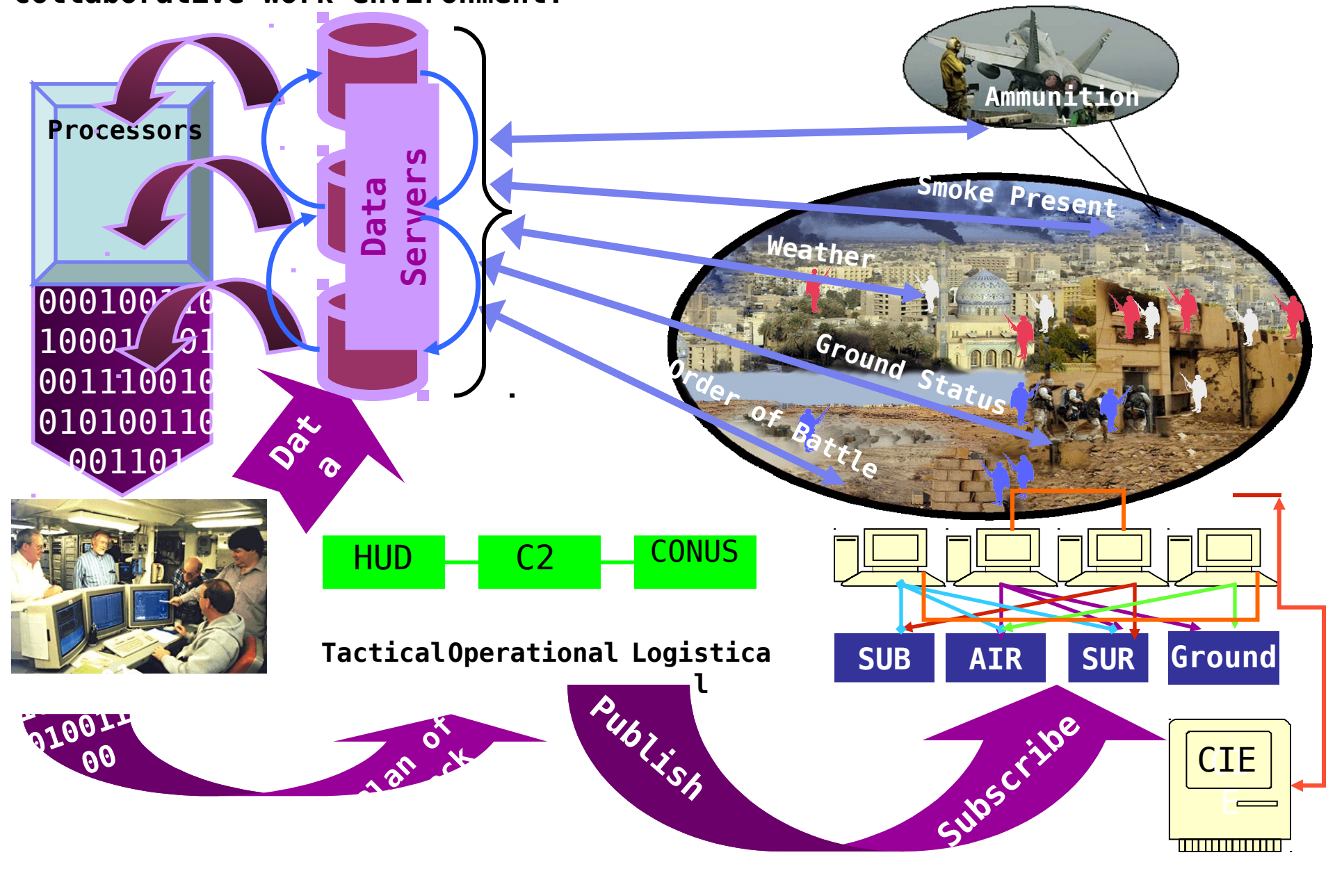
Capability 5: Process, sort, analyze, evaluate, and synthesize large amounts of disparate information while still providing direct access to raw data as required.



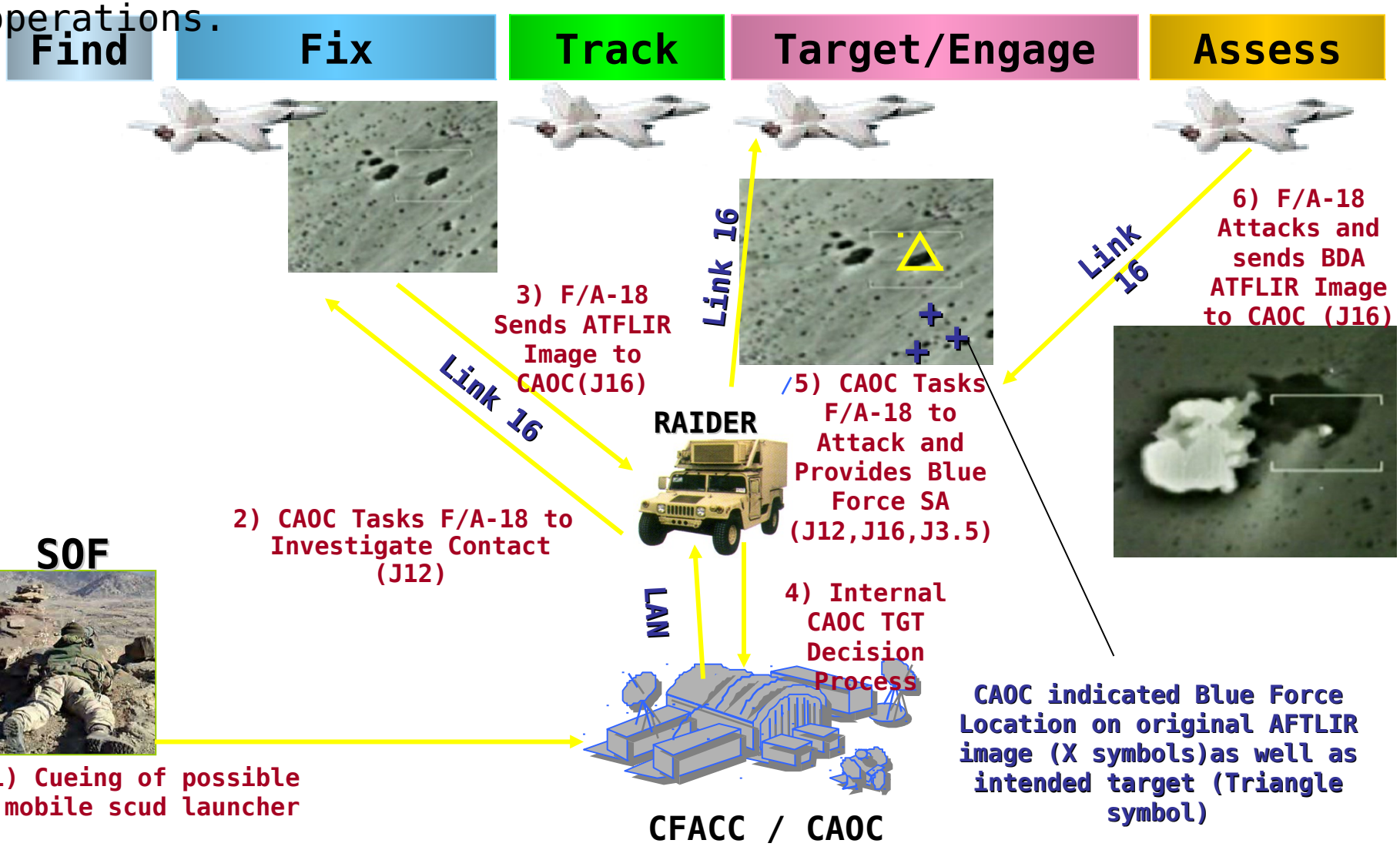
Capability 6: Allow each decision maker to depict situational information in a tailorable, user-defined, shareable, primarily visual representation.



Capability 7: Allow distributed groups of decision makers to cooperate in the performance of common command and control activities by means of a collaborative work environment.

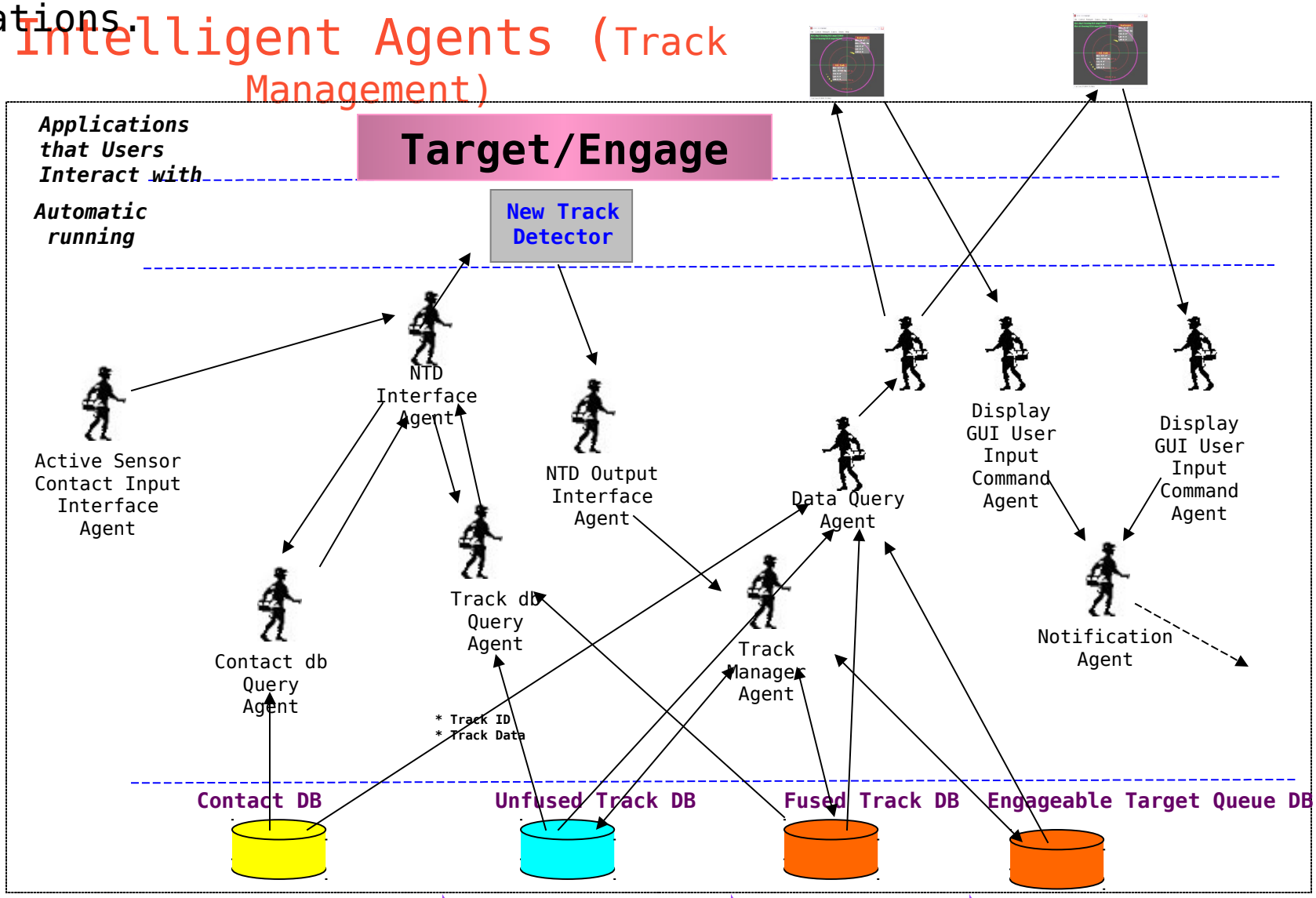


Capability 8: Automate lower-order command and control sub-processes and use intelligent agents and automated decision aids to assist people in performing higher-order sub-processes, such as gaining situational awareness and devising concepts of operations.


Find
Fix
Track
Target/Engage
Assess
Link 16
3) F/A-18 Sends ATFLIR Image to CAOC(J16)
Link 16
5) CAOC Tasks F/A-18 to Attack and Provides Blue Force SA (J12,J16,J3.5)
Link 16
6) F/A-18 Attacks and sends BDA ATFLIR Image to CAOC (J16)
RAIDER
2) CAOC Tasks F/A-18 to Investigate Contact (J12)
SOF
LAN
4) Internal CAOC TGT Decision Process
1) Cueing of possible mobile scud launcher
CFACC / CAOC
CAOC indicated Blue Force Location on original AFTLIR image (X symbols)as well as intended target (Triangle symbol)

Capability 8: Automate lower-order command and control sub-processes and to use intelligent agents and automated decision aids to assist people in performing higher-order sub-processes, such as gaining situational awareness and devising concepts of operations.

Intelligent Agents (Track Management)



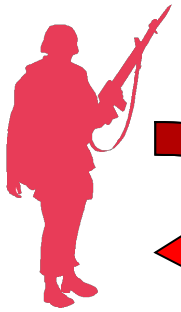
Capability 8: Automate lower-order command and control sub-processes and to use intelligent agents and automated decision aids to assist people in performing higher-order sub-processes, such as gaining situational awareness and devising concepts of operations.

(Mission Execution)

Capability 9: Provide information assurance.

Hacker

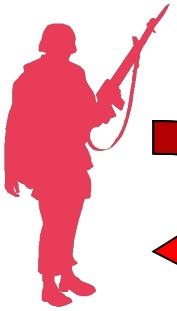
INFORMATION ASSURANCE



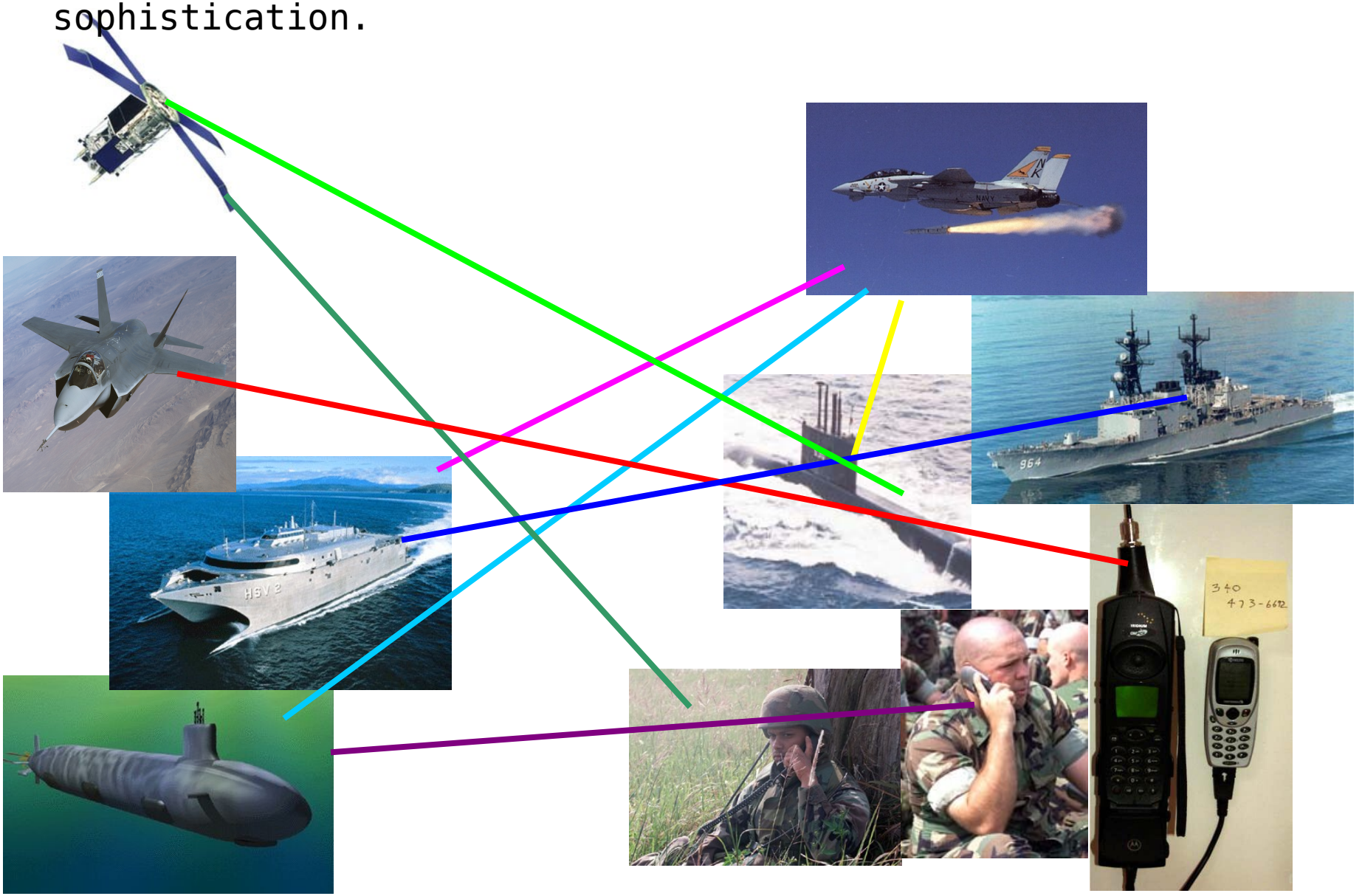
Capability 10: The ability to function in multiple security domains and multiple security levels within a [illegible] and to manage access dynamically.

INFORMATION ASSURANCE

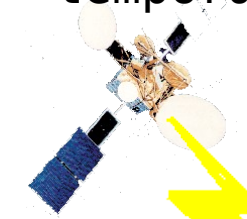
Hacker



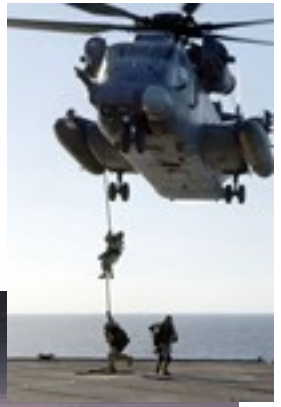
Capability 11: The ability to interoperate with command and control systems of very different type and level of sophistication.



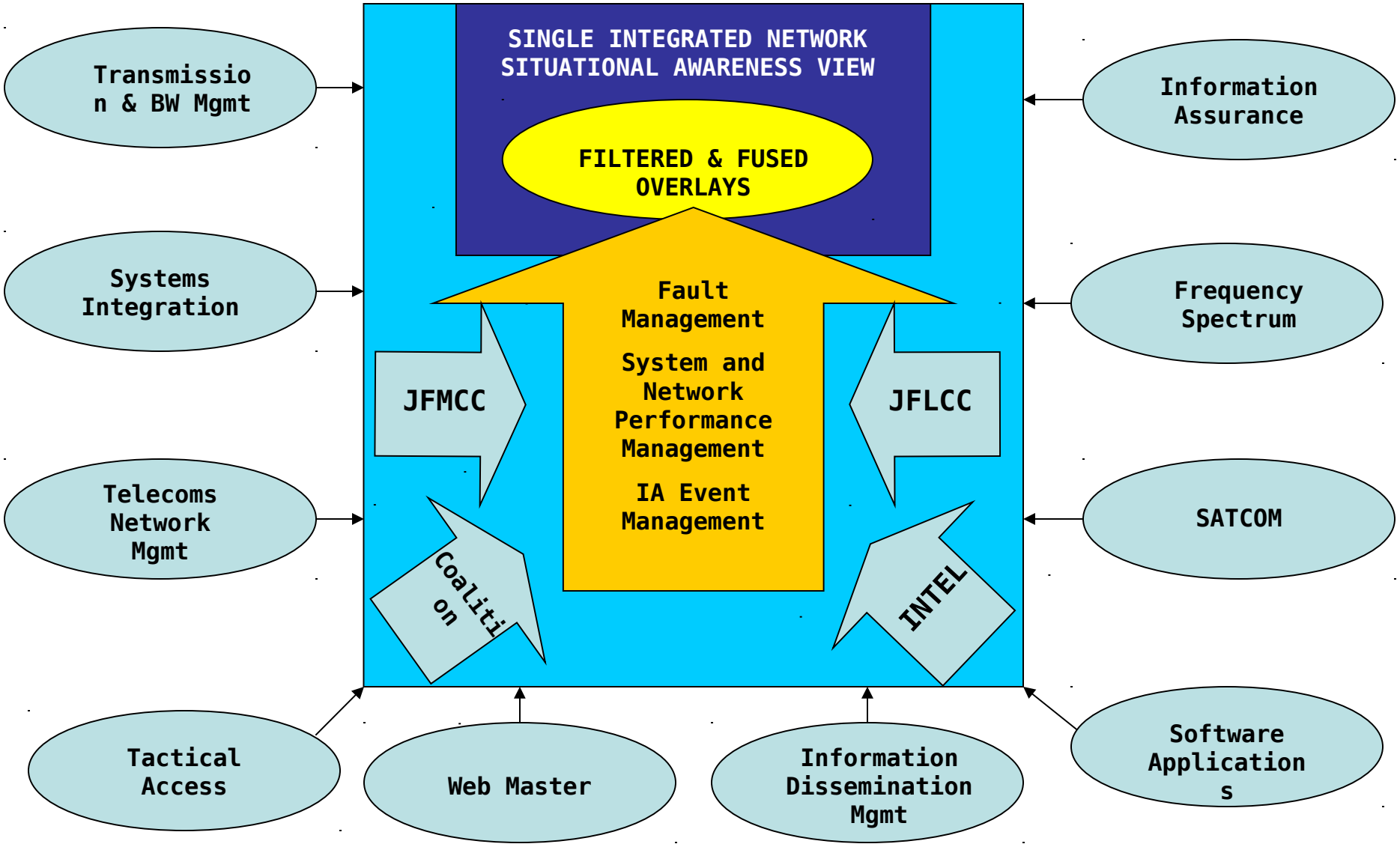
Capability 12: Allow individual nodes to function while temporarily disconnected from the network.



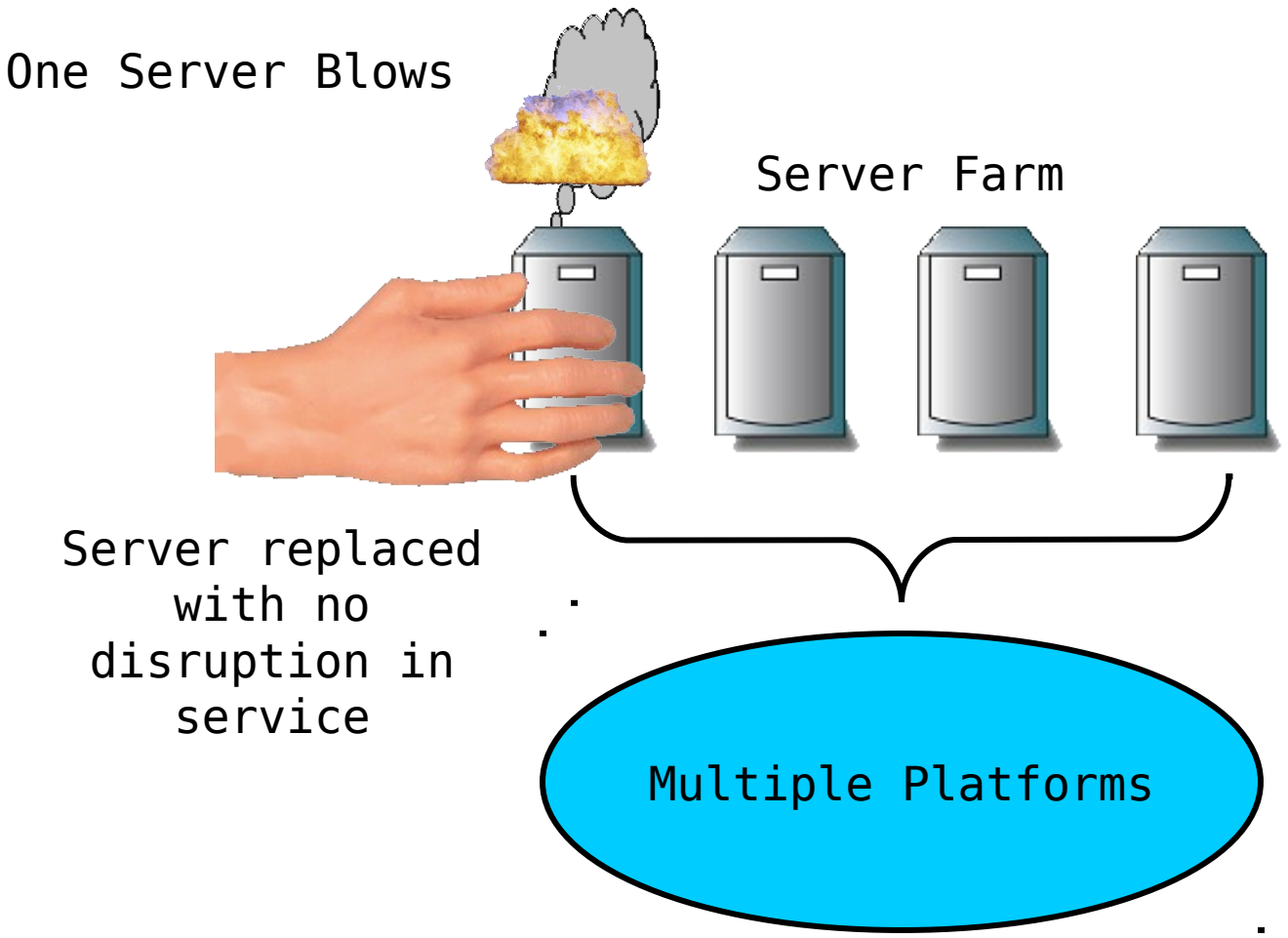
Sub is disconnected until able to get a Mission Data Update



Capability 13: Automatically and adaptively monitor and manage the functioning of the command and control system to ensure effective and efficient operation and to diagnose problems and make repairs as needed.

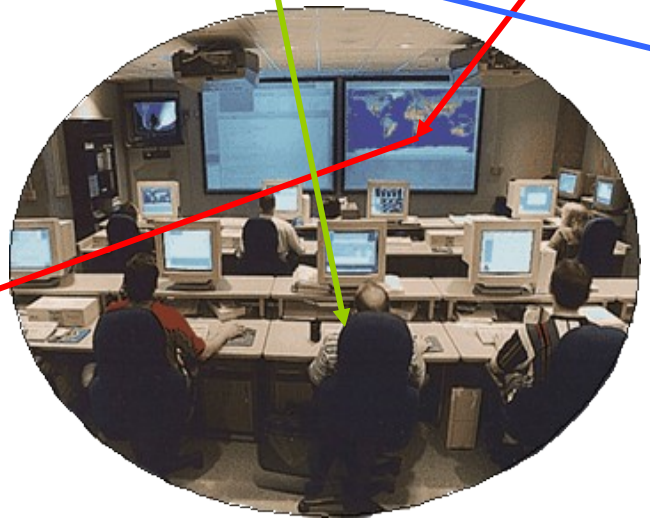


Capability 14: The ability to incorporate new capabilities into the system quickly without causing undue disruption to the performance of the system.



Capability 15: Ultimately, make and implement good decisions quickly under conditions of uncertainty, friction, time pressure and other stresses.

Capability 15: Ultimately, the ability to make and implement good decisions quickly under conditions of uncertainty, friction, time pressure and other stresses.



Capability 15: Ultimately, the ability to make and implement good decisions quickly under conditions of uncertainty, friction, time pressure and other stresses.

The Way Ahead

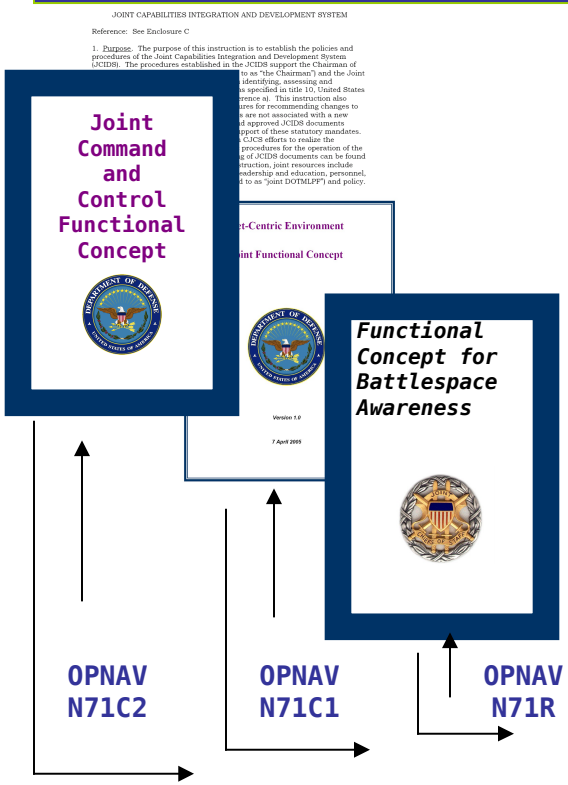
- FORCEnet Capability “decomposition”

- FORCEnet Capability List (FCL)

- FORCEnet CBA for the Globally-connected JFMCCs and Navy Maritime Organizations

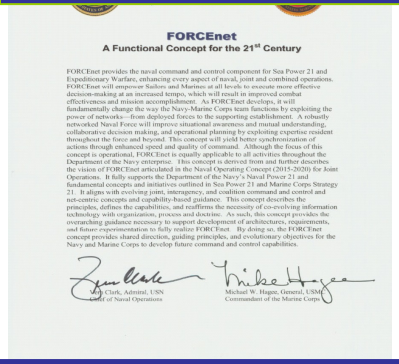
Alignment of FORCEnet Capabilities with JCIDS and NCDP

Joint Capabilities Integration and Development System

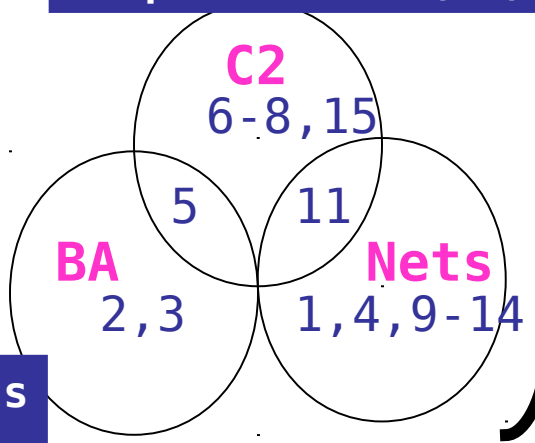

JOINT CAPABILITIES INTEGRATION AND DEVELOPMENT SYSTEM
Reference: See Enclosure C
1. Purpose. The purpose of this instruction is to establish the policies and procedures of the Joint Capabilities Integration and Development System (JCIDS). The procedures established in the JCIDS support the Chairman of
Joint Command and Control Functional Concept
Functional Concept for Battlespace Awareness
OPNAV N71C2
OPNAV N71C1
OPNAV N71R

Joint Functional Concepts ~ 120 Tasks

FORCEnet Functional Concept



FORCEnet Capabilities (15)



Naval Capabilities Development Process

COTP MCP

Nets MCP

ISR MCP

~ 45 Tasks

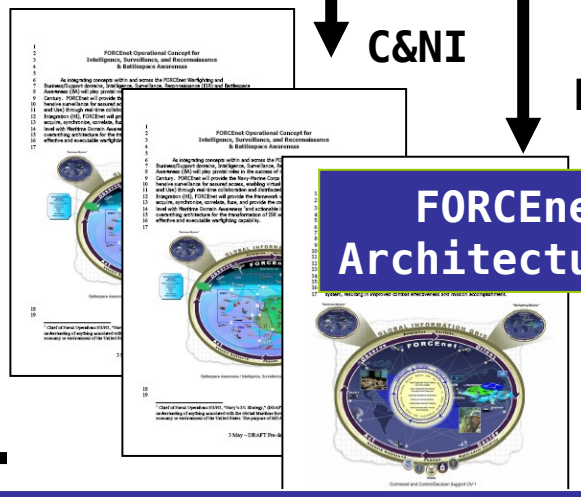
~ 55 Tasks

~ 30 Tasks

C2/DS

C&NI

BA/ISR



FORCEnet Architectures

g Joint tasks and attributes to inform FORCEnet Capabilities decomposi

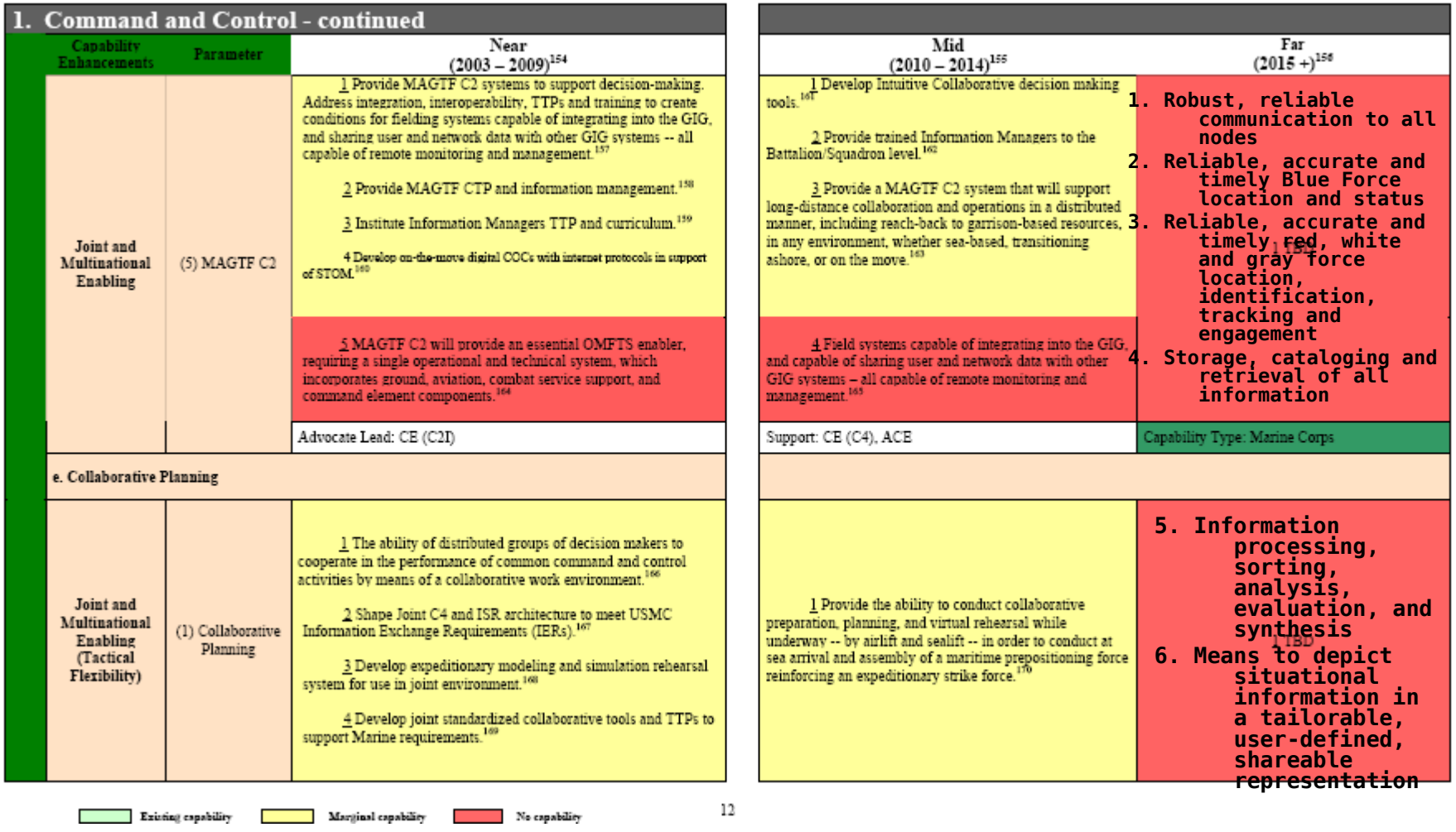
Fn5. Process, sort, analyze, evaluate, and synthesize large amounts of disparate information while still providing direct access to raw data as required.

Once information has been made available in a shared space, it must be examined and processed to make it more valuable to decision makers. This information management generally should occur as a service provided on the network. Information carries a ce

Information management systems should be flexible in the sense that they allow the manipulation of information in a variety of different ways and combinations. All information should be sortable by any number of categories, including time, type and sour

FORCEnet Capability	Associated MCP	Major Tasks	Attributes	Example Measures
Fn5. Process, sort, analyze, evaluate, and synthesize large amounts of disparate information while still providing direct access to raw data as required.	**ISR/Nets**	5.1. Ensure access to source data before and after any processing.	Accessible	Percent of information that is linked to its source data.
		5.2. Process source data into information.	Assured	*Percent* of data that is correctly processed.
			Capable	*Number* of systems information that can be processed.
			Effective	*Percent* of data that is processed.
			Flexible	*Number* of different systems information that can be processed, by information type.
				Number of information system types.
			Timely	*Seconds/minutes/hours* to process data (from receipt).
			Usable	Subjective determination of *usability* of information after processing (fully, marginal, unusable).
				Number of requests for clarification of information, by information type.
		5.3. Sort information (refers to arranging information according to categories or classes of metadata—e.g., by source, time, subject, etc.).	Assured	*Number* of instances of information placed in wrong category.
			Capable	*Number* of types of information that can be sorted.
			Effective	*Percent* of data that is sorted.
			Flexible	*Number* of information types that can be sorted from different systems, by information type and system.
			Timely	*Seconds/minutes/hours* to translate data (from receipt of request).
			Usable	Subjective determination of *usability* of information after sorting (fully, marginal, unusable).
				Number of errors generated during translation.
		5.4. Correlate information (refers to the sequencing of multiple inputs on the same object).	Assured	*Number* of instances of losing information pedigree after correlation .
				Percent of instances correlated tracks preserve original ID.
			Capable	*Number* of types of information/tracks that can be correlated.
			Effective	Subjective determination of *value* of correlated information (high, medium, low).
			Flexible	*Number* of different presentations that can be accomplished with correlated information.
			Timely	*Seconds/minutes/hours* to correlate information.
			Usable	Subjective determination of *usability* of correlated information (fully, marginal, unusable).
				Number of errors generated during correlation.

FORCEnet Capabilities List

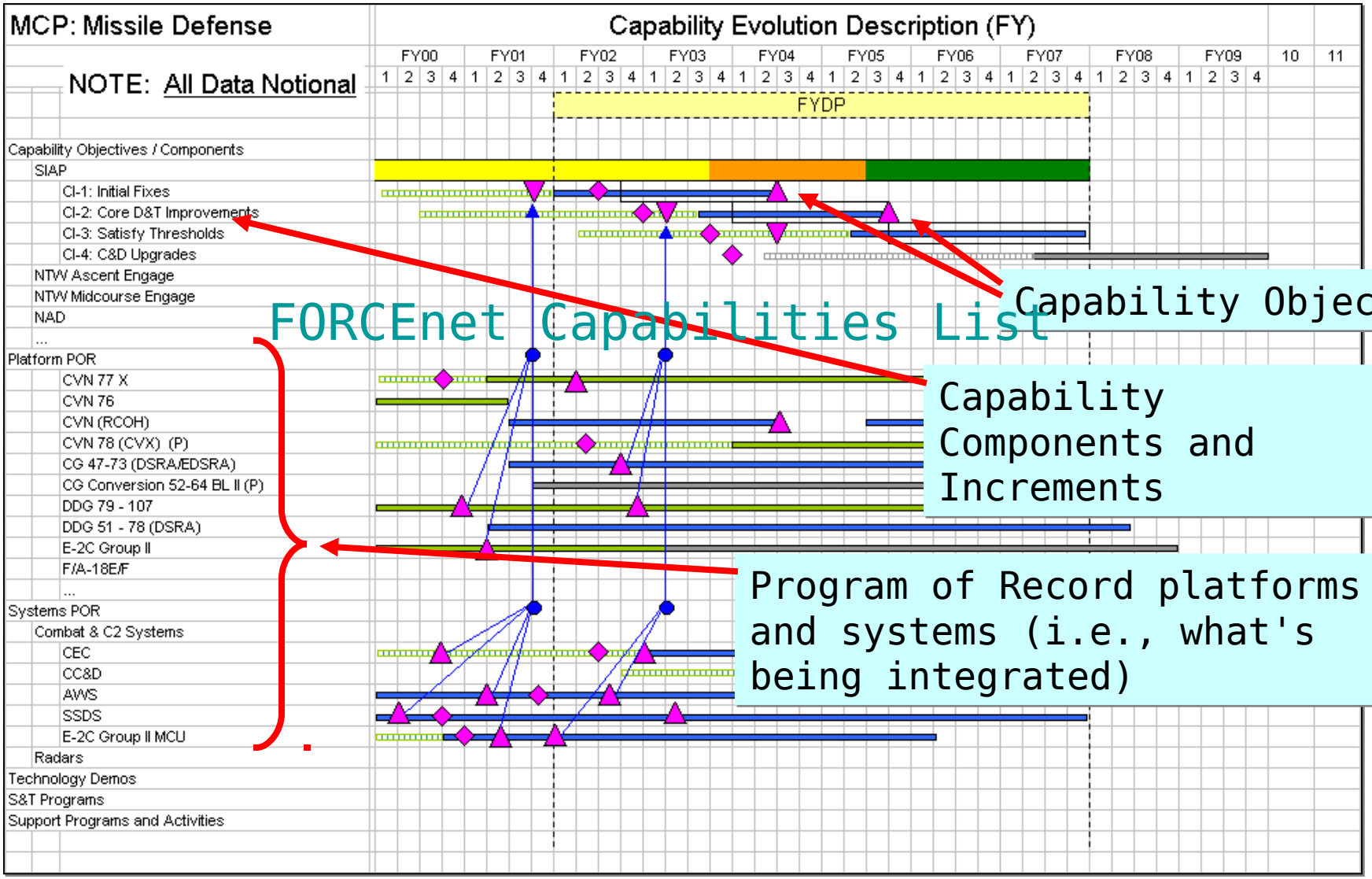


1. Command and Control - continued

Capability Enhancements	Parameter	Near (2003 – 2009)[154]	Mid (2010 – 2014)[155]	Far (2015 +)[156]
Joint and Multinational Enabling	(5) MAGTF C2	1 Provide MAGTF C2 systems to support decision-making. Address integration, interoperability, TTPs and training to create conditions for fielding systems capable of integrating into the GIG, and sharing user and network data with other GIG systems -- all capable of remote monitoring and management.[157] 2 Provide MAGTF CTP and information management.[158] 3 Institute Information Managers TTP and curriculum.[159] 4 Develop on-the-move digital COCs with internet protocols in support of STOM.[160]	1 Develop Intuitive Collaborative decision making tools.[161] 2 Provide trained Information Managers to the Battalion/Squadron level.[162] 3 Provide a MAGTF C2 system that will support long-distance collaboration and operations in a distributed manner, including reach-back to garrison-based resources, in any environment, whether sea-based, transitioning ashore, or on the move.[163]	1. Robust, reliable communication to all nodes 2. Reliable, accurate and timely Blue Force location and status 3. Reliable, accurate and timely red, white and gray force location, identification, tracking and engagement 4. Storage, cataloging and retrieval of all information
		5 MAGTF C2 will provide an essential OMFTS enabler, requiring a single operational and technical system, which incorporates ground, aviation, combat service support, and command element components.[164]	4 Field systems capable of integrating into the GIG, and capable of sharing user and network data with other GIG systems – all capable of remote monitoring and management.[165]	
		Advocate Lead: CE (C2I)	Support: CE (C4), ACE	Capability Type: Marine Corps
e. Collaborative Planning				
Joint and Multinational Enabling (Tactical Flexibility)	(1) Collaborative Planning	1 The ability of distributed groups of decision makers to cooperate in the performance of common command and control activities by means of a collaborative work environment.[166] 2 Shape Joint C4 and ISR architecture to meet USMC Information Exchange Requirements (IERs).[167] 3 Develop expeditionary modeling and simulation rehearsal system for use in joint environment.[168] 4 Develop joint standardized collaborative tools and TTPs to support Marine requirements.[169]	1 Provide the ability to conduct collaborative preparation, planning, and virtual rehearsal while underway -- by airlift and sealift -- in order to conduct at sea arrival and assembly of a maritime prepositioning force reinforcing an expeditionary strike force.[170]	5. Information processing, sorting, analysis, evaluation, and synthesis 6. Means to depict situational information in a tailorable, user-defined, shareable representation

Existing capability | Marginal capability | No capability

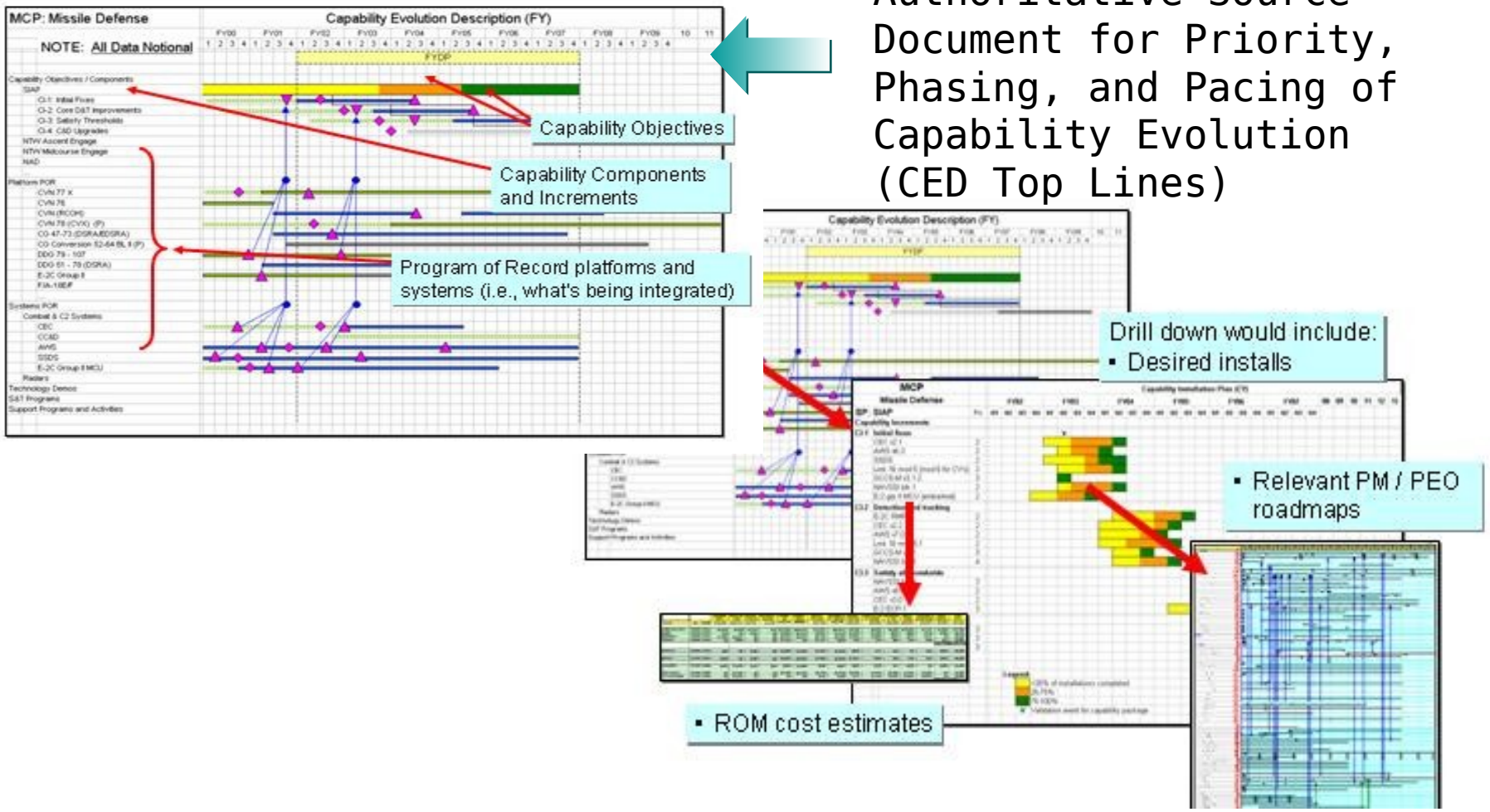
The Capability Evolution Description



FORCEnet Capability Evolution

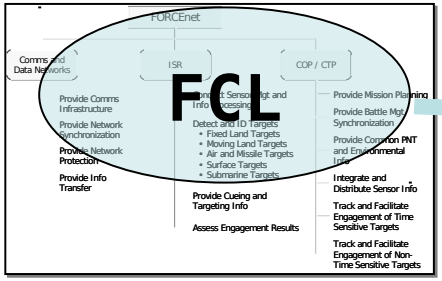
The Capability Evolution Description

FCL is the Advocate's Authoritative Source Document for Priority, Phasing, and Pacing of Capability Evolution (CED Top Lines)

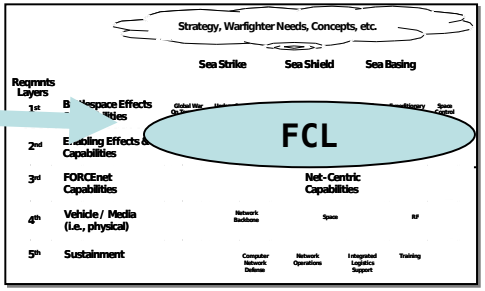

MCP: Missile Defense
Capability Evolution Description (FY)
NOTE: All Data Notional
Capability Objectives
Capability Components and Increments
Program of Record platforms and systems (i.e., what's being integrated)
Drill down would include:
▪ Desired installs
▪ Relevant PM / PEO roadmaps
▪ ROM cost estimates

How FCL will be Used

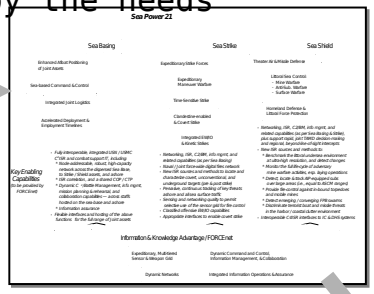
1. Refine the FCL



2. Catalog the WF needs

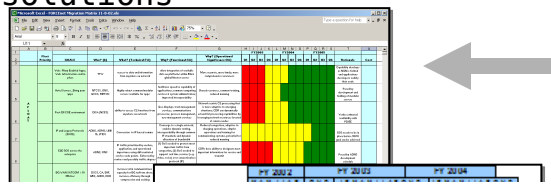


3. Derive the Fn capability attributes implied by the needs

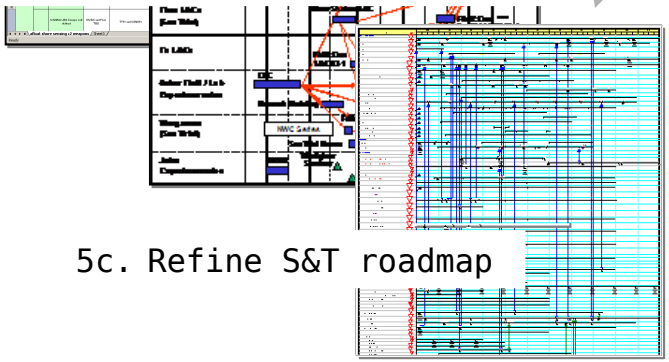


4. Mat'l or Non-Mat'l?

5a. Joint SYSCOM effort to propose / assess near / longer term material solutions

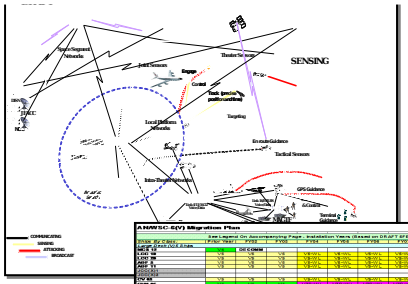


5b. Refine Fn innovation continuum

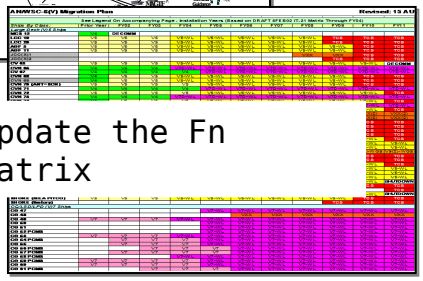


5c. Refine S&T roadmap

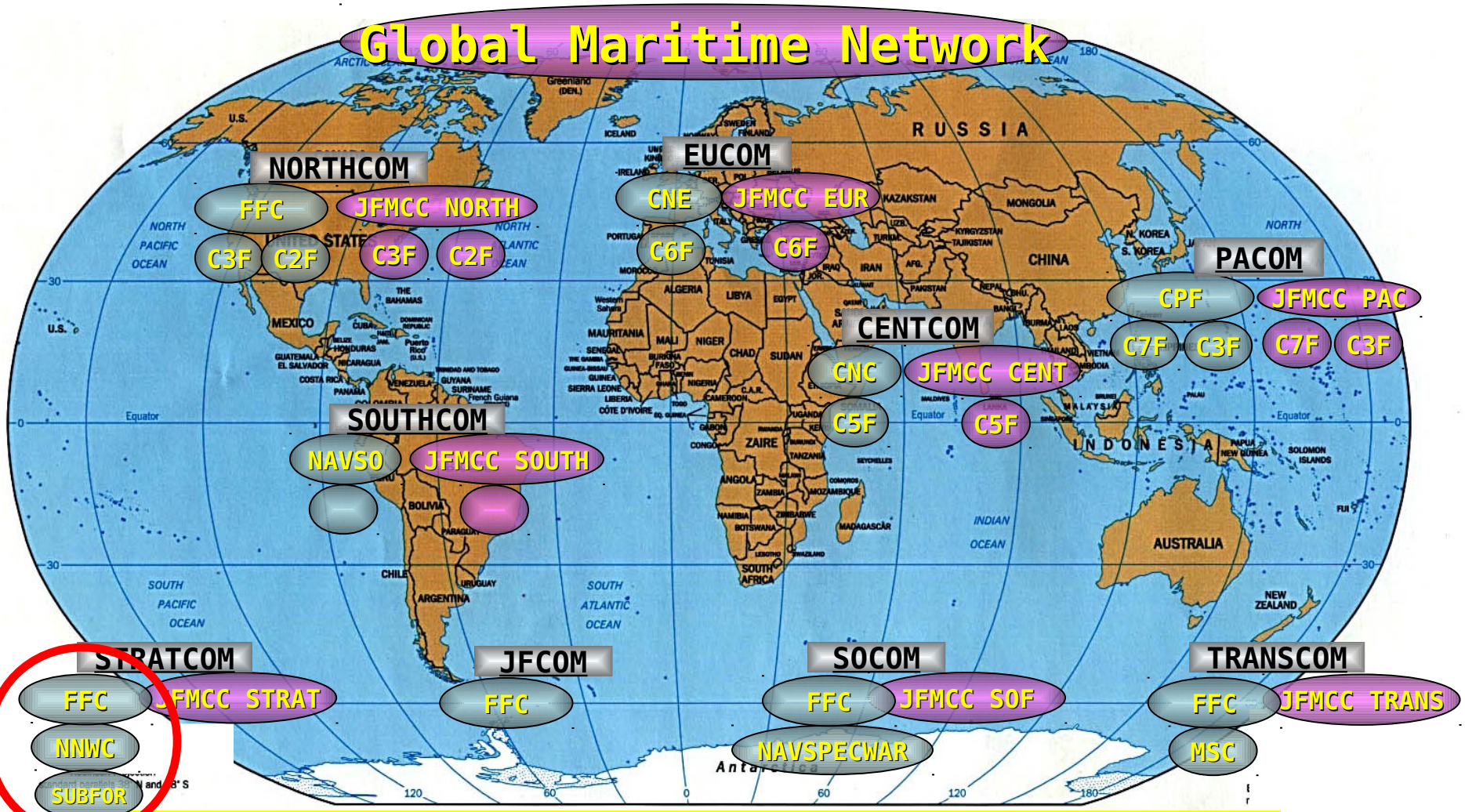
6a. Update the Fn architecture



6b. Update the Fn matrix



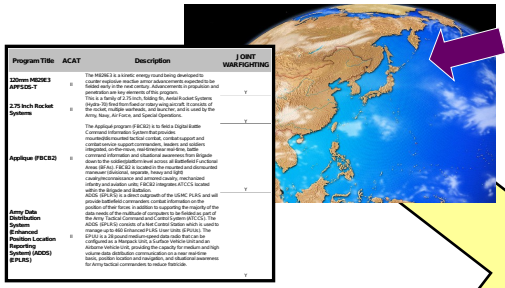
Globally-Networked Maritime Organizations



Distributed, collaborative, interdependent, global MDA

FORCEnet Capability Based Analysis (CBA) Globally-networked JFMCCs/Maritime Organization

POM 08 GWOT Scenario



- Force structure
- Operational context
- Red forces / blue forces

- Strategic context
- Persistent and enduring challenges
- Security objectives
- Assumptions

GWOT and MDA CONOPS O-

- Time-phased force deployment
- Time-phased objectives

FORCEnet Concept

ANNEX

Unclas… …king Papers

GWOT

HLD/ HLS

Major Combat OPS

Stab ilit y OPS

Joint … Concep… …l

January 2003

JFMCC GWOT-MDA CBA

8 August 2003

CAPABILITIES: the potential to achieve a desired battlespace effect that contributes to an operational objective in an uncertain environment through the execution of supporting tasks

CONOPS: how a Joint Force Maritime Commander integrates funct… means to achieve operational ends

Fundamental tasks, conditions and standards, capability gaps and DOTMLP_F alternatives to fill the gaps for how a Joint Force Maritime Commander will integrate capabilities to generate effects and achieve an objective in a GWOT / MDA environment

Questions?